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PAPERS

IN

MECHANICS.

The SILVER MEDAL *of the Society was this Session voted to Captain* WILLIAM BOLTON, *of the Royal Navy, for his Improvement in Jury Masts. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model is preserved in the Society's Repository.*

SIR,

HEREWITH you will receive the model of a plan for fitting ships' jury masts, to be formed from the spare spars usually carried on board King's ships, and in every merchantman that is properly found. By having jury masts so fitted, ships will be enabled to carry as much sail as on the usual regular mast; the great use of which I need not dwell on, only observing that it may be of great importance to fleets after a general action, or when in want of proper lower masts, either at home or abroad, and enable ships, after the loss of their mast, to prosecute their voyage, or service, without any deficiency of sail.

I beg you will be pleased to lay it before the Society, and I have the honour to be,

Sir,

Your obedient humble Servant,

Wm. BOLTON.

His Majesty's Ship Fisgard,
Sheerness, Oct. 31, 1807.

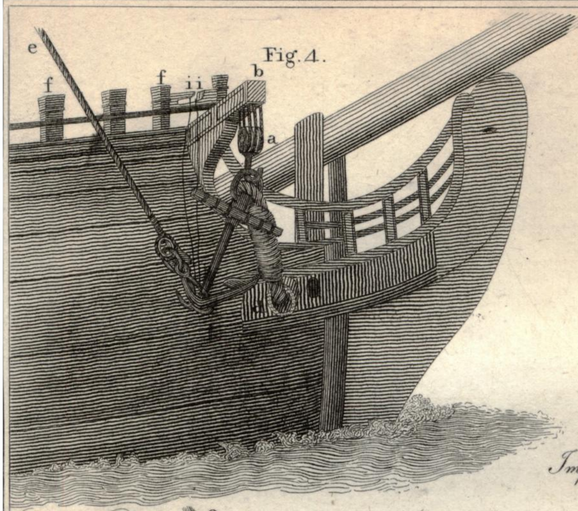
To C. Taylor, M. D. Sec.

REMARKS.

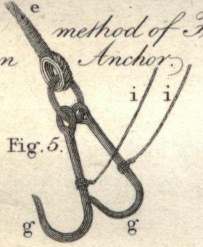
In the model in the Society's possession the main mast is broken about one-third of its length above the deck, proper partners are secured on the deck, in which a hand mast and spare main top mast are fixed on each side of the broken main mast, and secured thereto by two spare caps, morticed on a square made in its centre. A strengthening cap, moveable on these additional masts, connects them, and the upper parts of these masts are secured firmly by trustle trees in the main top. The foot of a spare fore top mast passes through a cap made from strong plank, morticed into the heads of the two temporary masts above mentioned, goes through the main top, and rests in the moveable strengthening cap, which connects those two masts, and enables the fore top mast to be raised to any height which the main top will admit, and be then firmly secured by the upper cap, the main top, and the strengthening cap below it. The fore top mast being thus adjusted, the cross trees and top gallant mast are mounted upon it, which completes the whole business.

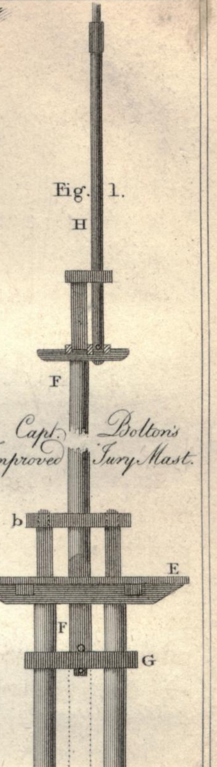
Two caps are the only things necessary to be made expressly for the purpose, the other articles being usually ready on board the ship.

Reference

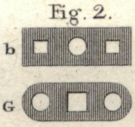


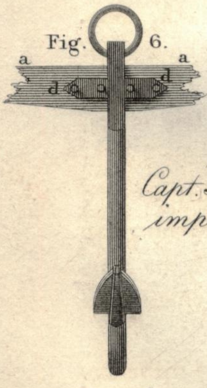
Capt. Ball's method of Fishing an Anchor.

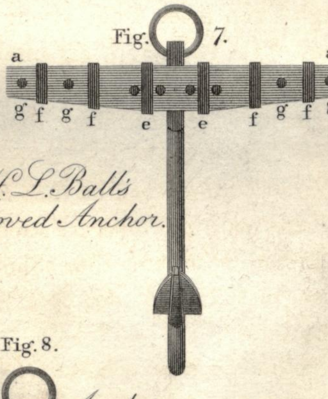




Capt. Bolton's Improved Jury Mast.

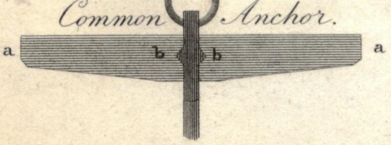






Capt. H. L. Ball's improved Anchor.

Fig. 8.



Common Anchor.

J. Farey. junr. del.

Engraved by S. Porter.

Reference to the Drawing of Captain Bolton's Jury Mast. Plate II. Figs. 1, 2, *and* 3.

Figs. 1, 2, and 3, where A A represents the partners or pieces of timber which are bolted to the quarter deck for the mast to rest upon. B is the stump of the lower mast, which is cut square at the top, and of the same size as the head of the mast originally was; upon this square, the main and spare lower caps *a a* are fixed; two mortices must be cut in the partners A A to receive squares made at the lower ends of the two temporary masts D D, which are supported by the caps *a a*, one of them is a spare main top mast, the other a hand mast; these two support the main top E, additional squares being made on the tressel trees to receive each of them. *b* is a cap shown in fig. 2, made of four inch plank doubled for the purpose, and fitted upon the heads of the masts D D, for a fore top mast FF, the heel of which rests in a mortice made in the stump of the lower mast; it is also steadied by a double cap G, separately shown in fig. 3, on which it fids finally on the top. The top-gallant mast H is fixed to the mast F by the top and cap in the usual manner. The figures 2 and 3 show the caps separated from the masts, and are the only things necessary to be made for the purpose; and the object of the cap, fig. 2, is to steady and prevent any wringing of the lower jury mast, and to fid the top mast whenever it is reefed. The fore top mast F F appears in two separate pieces, on account of its length.

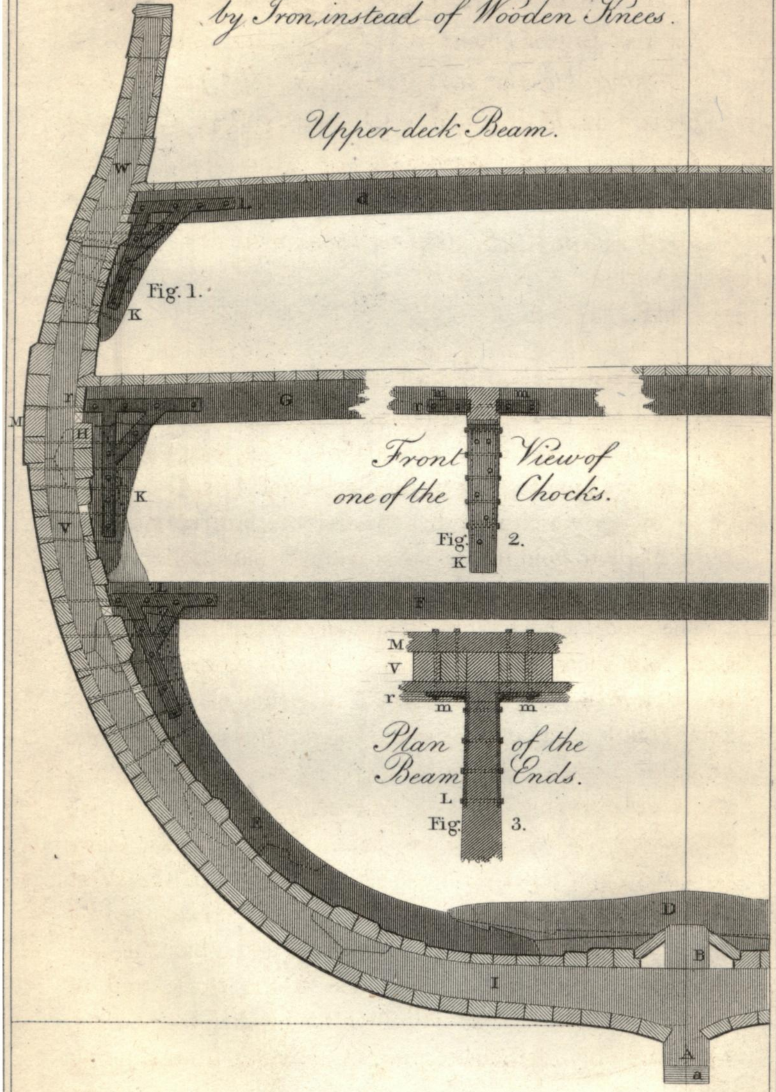
The SILVER MEDAL *of the Society was this Session voted to Captain* H. L. BALL, *of the Royal Navy, for an Improvement in Anchors, to render them more durable and safe for Ships, and for his Improved Mode of Fishing Anchors. The following Communications were received from him, explanatory Engravings are annexed, and Models are preserved in the Society's Repository.*

SIR,

THE great expense of timber in the navy for anchor stocks, and the frequency of their failing or giving way in the centre, where the square of the anchor is let into the stock, have induced me to offer to the Society of Arts, &c. a plan of an anchor which may be cheaper in construction, and more likely to hold in various situations than those in common use.

The model I have sent will sufficiently explain my intention, and show how beneficial it may be in strengthening the anchor stocks. I wish much to notice to you its probability of holding in the ground longer than other anchors, on account of the additional weight of the stock; and this will more particularly be the case in banks which shelve suddenly down from the shore, such as at St. Helena, Cawsand Bay, and indeed in most of the islands in the West Indies. The proportion of additional iron, as explained by my model, is in all anchors to be twice and a half the diameter of the shank from each side at the stock, and of course this mode will supply the place of the present nuts, which are only intended to prevent the stock from slipping in

Mr. T. Roberts's Method of attaching the Ends of the Beams of Ships, to their Sides by Iron, instead of Wooden Knees.



J. Farey junr. del.
Engraved by S. Porter.

in and out, whenever it becomes loose, which accident anchors are very liable to in hot climates. My anchor stocks will save a considerable quantity of the finest timber, and give much greater security.

I likewise beg leave to offer to the Society a model of a double fish hook, for the purpose of fishing the anchor, an operation which, in the common mode of doing it, is frequently attended with accidents both to the ship and crew, from the anchor suddenly slipping unexpectedly in raising it to its proper position.

I flatter myself that these improvements will meet with the Society's approbation.

I am, Sir,

Your most obedient humble Servant,

H. L. BALL.

Lower Mitcham, Feb. 13, 1808.

To C. Taylor, M. D. Sec.

Reference to the Engravings of Captain H. L. Ball's *Method of Fishing an Anchor. See Plate II. Figs.* 4 *and* 5.

Fig. 4, Pl. 2, represents Captain Ball's method of fishing an anchor. Fig. 5 shows an enlarged view of his double hooks used for that purpose.

In the usual operation of heaving an anchor, it is drawn up by the cable until it appears above water; the cable will not now raise it higher, it is therefore bowsed up by the cat block *a*, fig. 4, from the cat head *b*, the cable *d* being slackened out as it rises. When it is got up as high as the cat block will raise it, a strong hook, called the fish hook,

fastened

fastened to a rope *e*, which is suspended by a tackle from the shrouds, is hooked to the anchor at the bottom of the shank, and thus the arms of the anchor are elevated above the stock, until one of the flukes is brought up to the timber heads *f f*, to which it is made fast by a rope and chain, called the shank painter. In this operation the fish hook sometimes slips and occasions mischief, to remedy which, Captain Ball has applied two hooks instead of one, which keep firmer hold. These hooks are shown upon an enlarged scale at *g g*, fig. 5, attached to the rope *e*; each of these hooks take one of the arms of the anchor, close to the shank, and hold it firmly. *i i* are two small lines made fast to the hooks, to direct them so as to get proper hold of the anchor.

Reference to the Engraving of Captain H. L. BALL's *Improvement in the Formation of Anchors. See Plate II. Figs.* 6, 7, *and* 8.

This anchor, in external appearance, differs very little from the common anchor; the improvement consists in forming and fixing of the shank of the anchor to the stock. The stock *a a*, figs. 6 and 7, is made of two pieces of oak bolted together, and well secured by hoops. In the common method, in order to prevent the anchor stock from slipping off the shank, a square projection *b b*, fig. 8, is forged upon the shank; this is improved by Captain Ball, as shown in fig. 6, where this projection *d d* is extended on each side of the shank, far enough to receive two bolts through each of these extensions, which bolts hold firmly together the two pieces of timber which form the stock, and secure the stock fast to the shank. Two iron hoops, fig. 7, *e e*, are driven on the stock between the bolts, and *ffff* are other hoops, and *g g g g* are tree-nails to strengthen the whole.

The SILVER MEDAL *of the Society was this Session voted to* Mr. THOMAS ROBERTS, *of the Navy Office, for his Improvement in Ship Building, by securing the Ends of the Beams of Ships without Wooden Knees. The following Communications were received from him, an explanatory Engraving is annexed, and a Model and Drawing are preserved in the Society's Repository.*

SIR,

I BEG leave to send you herewith a sketch of the midship section of a 74 gun ship, showing a more effectual method of securing the beams of ships to their sides, and for superseding the necessity of standards, top and breadth riders, and nearly of wood knees altogether, which, after repeated trials, have been found fully to answer the intended purpose, and for which invention I have been rewarded with a premium of 800l. by the King's Order in Council of the 18th of October last, on the recommendation of the Lords of the Admiralty, and the Honourable Commissioners of his Majesty's Navy, which I wish to be laid before the Society of Arts, &c. if you think the merits of it worthy their notice. As the subject has not been published, I hope it will appear deserving of some mark of the Society's approbation; and in order to show that it is not a speculative business: I beg leave to subjoin a list of ships that have been built, and are now building, agreeably to this mode.

I am, Sir,
With the greatest respect,
Your humble servant,
THOMAS ROBERTS.

Navy Office, May 3, 1808.
To C. Taylor, M.D. Sec.

A List of Ships Built and Building for his Majesty's Service, whose Beams are secured on a Plan proposed by Mr. Thomas Roberts, *Assistant Surveyor of his Majesty's Navy.*

BUILT.

Ships' Names.	*Guns.*
Lively	38
Melampus	36
Jason	32
Hebe	32
Circe	32
Pallas	32
Alexandria	32
Thames	32
Resistance	38
Spartan	38
Undaunted	38
Valiant	74
Elizabeth	74
Cumberland	74
Venerable	74
Aboukir	74

NEARLY COMPLETE.

Ships' Names.	*Guns.*
Caledonia	120
Milford	74
Cornelia	32
Nereus	32
Bucephalus	36
Semiramus	36
Dolphin	44

BUILDING.

Ajax	74
Conquestadore	74
Vigo	74
America	74
Berwick	74
Vengeur	74
Scarborough	74

Reference to the Engraving of Mr. ROBERTS' *Method of applying Iron Knees to connect the Ends of the Beams to the Sides of Ships, Pl. III. Figs.* 1, 2, *and* 3.

Fig. 1. the one half of a midship section of a large ship. A is the keel, with the false keel *a* beneath it. B the kelson, D chocks bolted thereto, to retain the opposite pieces of the riders E firmly together; F one of the orlop beams, G one of the lower deck beams, and *d* one of the upper deck beams; H are the clamps which sustain the extremities of the beams, I the floor timbers laid across the keel and bolted to it, V the several futtocks, and W the top timbers, which are all united into one frame: K are the wooden chocks bolted to the ship's sides, and L are the iron knees by which the beams are made fast to the chocks; these knees are also bent and bolted to the ship's sides, as shown by L *m m* in figs. 2 and 3. In fig. 3, which is a plan of the beam ends, M is the outside plank, V the timbers, and *n* the filling between the timbers.

The bolts for the chocks and iron knees go through all these as shown by the dotted lines. The dimensions of the iron knees are as follows:

Upper deck flat iron knees, breadth four inches and a half, thickness one inch.

Lower deck iron knees, breadth five inches, thickness one inch and an eighth.

Orlop iron knees, breadth five inches, thickness one inch and an eighth.

CERTIFICATES.

SIR,

We feel ourselves called upon by a strong sense of the necessary attention due to the merit of an individual, to state to you, for the information of the Right Honourable the Lords Commissioners of the Admiralty, the great utility which has resulted to his Majesty's service, from a method of fastening the beams of ships to their sides, to which resource we have found it absolutely necessary to resort, from a general failure of the supply required of wood knees.

This contrivance is the invention of Mr. Roberts, assistant surveyor of his Majesty's navy, and has been found, after repeated trials, to answer the purpose for which it was intended. We consider it as an object of great importance in ship building, and we therefore beg leave to recommend to their Lordships' consideration, that a premium, (such as may in the judgment of their Lordships be a just reward for an invention of so much utility), be granted to Mr. Roberts, as a reward for his thus contriving a substitute so beneficial, and as an encouragement to others, to exert their inventive powers in producing works of similar worth.

We remain, &c. &c. &c.

THO^{s}. B. THOMPSON.
W. RULE.
HENRY LEGGE.

Navy Office, Sept. 27, 1806.

To William Marsden, Esq.

At the Court at the Queen's Palace, the 28*th October*, 1807.

PRESENT

The King's Most Excellent Majesty in Council.

Whereas there was this day read at the Board, a Memorial from the Right Honourable the Lords Commissioners of the Admiralty, dated the 27th of this instant, in the words following, viz.

May it please your Majesty,

The principal Officers and Commissioners of your Majesty's Navy, having represented to us, by their letter of the 27th September, 1806, that they felt themselves called upon by a strong sense of the merits of an invention of Mr. Thomas Roberts, assistant to the Surveyors of your Majesty's Navy, for fastening the beams of ships to their sides, to which expedient it was found absolutely necessary to resort, from the general failure of the supply required of wooden knees, to represent that the invention has been found, after repeated trials, to answer the purpose for which it was intended; and is considered as an object of great importance in ship building.

And the said principal Officers and Commissioners having, by their letters of the 20th and 24th of this month, confirmed their former opinion of the utility of the contrivance, and after earnestly recommending that some reward should be granted to Mr. Roberts, set forth they are of opinion the sum of eight hundred pounds will be a proper recompense.

We have taken the same into our consideration, and concurring in opinion with the Navy Board as to the ingenuity of Mr. Roberts' invention, and the advantages that may reasonably be expected to be derived from it, do most humbly propose to your Majesty, that your Majesty will be graciously pleased to authorise us to direct the Commissioners of your Majesty's Navy, to present him with a sum not exceeding eight hundred pounds, as a reward for the same.

His Majesty having taken the said memorial into consideration, was pleased, by and with the advice of his Privy Council, to approve of what is therein proposed:—And his Majesty doth hereby authorise the Lords Commissioners of the Admiralty to direct the Commissioners of his Majesty's Navy to present the said Mr. Thomas Roberts with a sum not exceeding eight hundred pounds, as a reward for the invention.

W. FAWKENER.

(A Copy.)

GENTLEMEN,

HIS Majesty having been pleased, by his order in council of the 28th inst. upon our humbly laying before his Majesty the representation which you had made to us, of the merits of an invention of Mr. Thomas Roberts, assistant to the Surveyor of the Navy, for fastening the beams of ships to their sides, the utility of which invention has been found, after repeated trials, to answer the purpose for which it was intended, and is considered an object of great importance in ship building, to direct that a sum be presented to the said Mr. Roberts, not exceeding eight hundred pounds, as a reward for his invention. We send you herewith a copy of his Majesty's order in council aforementioned, and do hereby desire and direct you, in pursuance thereof, to cause the sum of eight hundred pounds to be presented to the said Mr. Roberts, as a reward for his invention.

We are,

Your affectionate Friends,

R. BICKERTON.
W. JOHNSTONE HOPE.
R. WARD.

Admiralty Office, Oct. 30, 1808.

(A Copy.)

The Silver Medal *of the Society was this Session voted to Major* Charles Le Hardy, *of the Island of Jersey, for his Invention of a Telegraph. The following Communication was received from him, an explanatory Engraving is annexed, and a complete Working Model is preserved in the Society's Repository.*

SIR,

Having discovered a mode of communicating by signals, which to me seems to unite every advantage that can be expected for that mode of communication, I beg leave to transmit to you a plan of it, and to write a few explanatory lines upon the subject.

The telegraph, of modern invention, is an improvement on communication by signals, which has been in use for many ages. Monsieur Chappe was, I believe, the first who proposed a machine for that purpose, which was put in execution about the year 1793. Since that time several modes have been proposed by different persons, none of which seem to have fully attained the object. A machine of this kind should be simple and easy to comprehend. All those which have come to my knowledge are executed by combinations, which render them too complicated for common use, and therefore liable to many errors. That which I now submit to your consideration, seems to me to have removed every objection of the kind; it is simple, easy to comprehend, and extensive in its means; its combinations, which by simple numeration may be carried to 40,000, might with ease be extended to almost infinite numbers;

Major C. Le Hardy's Telegraph.

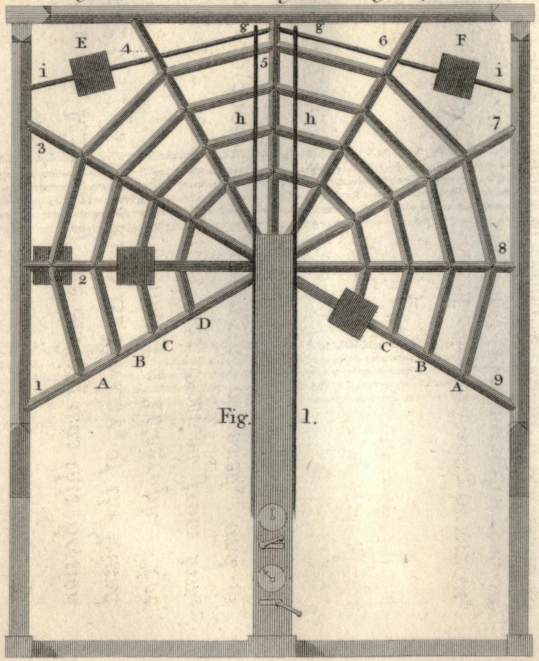


Fig. 1.

Fig. 3.

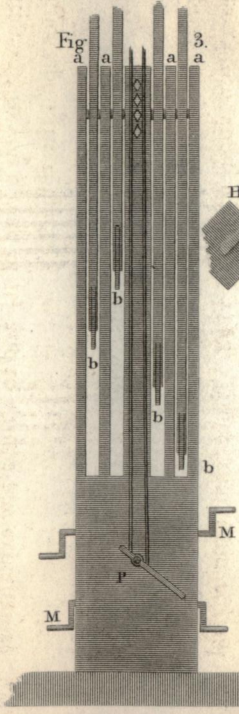
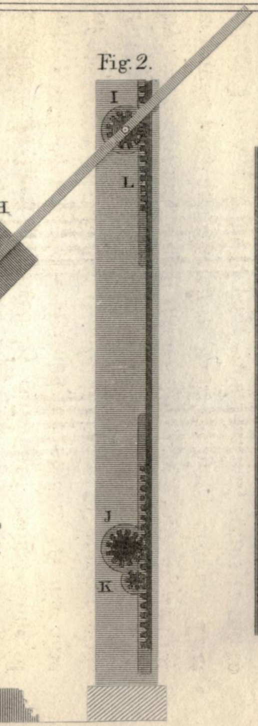
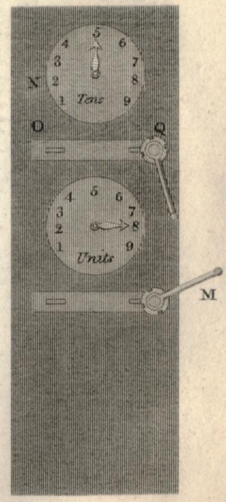


Fig. 2.



Index.

Fig. 4.



J. Farey, jun.r del.

Engraved by S. Porter.

numbers; but the present seems sufficient to answer every purpose. All the words in Entick's Dictionary amount to about 25,000; every one of which may thus be numbered. With how much more dispatch would a letter be communicated by signals which express words, than by signals which express only letters. Words may be forwarded as fast as they can be looked for in a dictionary; and even whilst only an equal number of letters could have been communicated by the present mode. Another advantage resulting from the use of words in telegraphic correspondence is, that the words of the same meaning in the several languages having the same number, correspondence may be carried on from one language into another, which though not grammatically correct, yet would be sufficiently intelligible.

Proper names must be spelt, which may easily be done, every letter having a corresponding number.

Though the use of telegraphs has to this time been confined to military purposes, yet a machine of this kind is well adapted to accelerate commercial communication from one end of the kingdom to the other. The arrival, the departure of vessels, the various transactions of commerce, might be speedily announced, to the very great advantage of trade. By this method inaccessible places might communicate their wants, and correspondents, though at a distance of five or six miles, might erect them for a trifling expense. I made the experiment with one of eight feet by ten, and with the use of a telescope, I took down every number from a distance of a mile and a half.

I remain, Sir,

Your most obedient and humble Servant,

CHARLES LE HARDY.

London, Jan. 13, 1808.

To C. Taylor, M. D. Sec.

Reference

Reference to the Engraving of Major C. LE HARDY'S *Telegraph. See Plate IV. Figs.* 1, 2, 3, *and* 4.

This machine is intended to express numbers, which may be seen at a distance, and to which words may be referred at pleasure.

Fig. 1 represents a front view of the machine—it is composed of nine bars or radii, answering to the nine figures of arithmetic, as numbered in the plate. The four polygonal or concentric bars, A. B. C. D. which intersect the radii, are for the decimals; thus A stands for units, B for tens, C for hundreds, D for thousands. Over each of these concentric bars or circles, an index, as that marked H, fig. 2, traverses, which marks the number of thousands, of hundreds, of tens, and of units, as far as ten thousand; for instance, if it is required to make the number 9202, turn the hand H in the circle D of thousands to the radius 9, then the hand H in the circle C of hundreds to the radius 2, then, as there are no tens, turn the hand to the radius 2, upon the circle A of units; but as ten thousands are not sufficient to express the number of words in the English language, two square boards are added in the corners, of which that marked E is equal to 10,000, that marked F to 20,000, and both being shown together, are equal to 30,000, which, with the numbers made on the circles, bring it up to 40,000, which number is more by many thousands than all the words in the English language.

Fig. 2 is a view of the mechanism which works the signals round: this is done by means of a rack wheel at I, upon which is firmly fixed the hand with its signal board H; this wheel is made to revolve by means of a rack L, which being raised or lowered, makes it go backwards or forwards; this rack is set in motion by the pinion K, to which is fixed a winch, as M, fig. 3. To prevent the necessity of inspecting the signals, the wheel I, to which is fixed an index, as at N, fig. 4, is added, which revolving in the same time as the signal board H, marks the number of the decimal, so that it may be worked correctly from within doors. O, fig. 4, is a bolt to stop the hands at any given point, by means of a wheel with four notches Q fixed to the pinion. Fig. 3 is a side section of the machine, the lines a a a a represent boards, upon each of which is fixed the mechanism, fig. 2. b b b b are the hands and signal boards, one of which is shown at H, fig. 2. The square boards E and F, fig. 1, are fixed upon iron bars which pass through the bars or radii 4 and 6, and have each of their ends made to move in holes in the radius 5, and in the frame at i i, fig. 1, upon which they turn a quarter round, by means of cross bars at g g, to each end of which ropes or wires h h are fastened, and which are connected with two levers, one of which is shown at P, fig. 3, the raising or depressing of which makes them appear or disappear as required.

The SILVER MEDAL *of the Society was this Session voted to the* CHEVALIER A. N. EDELCRANTZ, *President of the Academy of Arts, and Superintendant of his Swedish Majesty's Buildings in Sweden, for a Telegraph of his Invention. The following Communications were received from him, an explanatory Engraving is annexed, and a complete Working Model is preserved in the Society's Repository.*

DEAR SIR,

SINCE I left London two years ago, my time, by different occupations, has been almost drawn away from those pursuits which were formerly the dearest objects of my attention, and which procured me the honour of being elected a member of the Society of Arts, &c.

Nothing, however, Sir, shall interrupt those sentiments of gratitude or respect which I owe to the Society, and which, on every occasion, I shall be happy to prove.

I have sent, by Mr. MURRAY, of Leeds, a model of the telegraph which I contrived in Sweden twelve years ago, and which since that time has been in constant use on both sides of the Baltic, besides other places in this country. Its office near the Baltic consists chiefly in facilitating the communication of posts between Russia and Finland on one side, and Sweden and England on the other; and in that respect I dare flatter myself that it has not been quite useless to your country. I shall esteem it a favour if the Society will accept the model I have sent, with two printed publications descriptive of this machine, one in the Swedish, the other in the French language, as a small proof of my respect and desire to promote the great views of the Society, for the general benefit of mankind.

I have the honour to remain, with great sincerity and esteem,

Dear Sir,

Your most obedient humble Servant,

A. N. EDELCRANTZ.

Stockholm, Nov. 25, 1806.

To C. Taylor, M. D. Sec.

Dear Sir,

In the month of September, 1794, I commenced my experiments on telegraphs. The first I constructed was much upon the French plan, but I have since given the preference to my present telegraph, which occupies less space, and the signals by it are made quicker, easier, and with more clearness and certainty of sight. My telegraph contains ten shutters or vanes in three vertical ranks, the centre one of which having four. By means of this construction 1024 changes or signals may be clearly shown. It would be possible, by this machine, to show 4,037,912 changes; but the attention required in such case would occasion much uncertainty, because it would then be necessary not only to observe what vanes are visible, but to attend also to the order in which they are exhibited.

To express certain words which frequently occur in correspondence, I prefer such signals as by their form may be most easily recollected. These I called fixed signals, because they form phrases of themselves, and shorten the correspondence, they may be easily known by examining

the

the numbers of a table, previously constructed, and referred to by the signals.

It is necessary that the telegraph should be placed above the level of the horizon, to prevent any object behind from rendering the vanes obscure. The vanes should be painted black, and the intervals between them greater than their diameters, that the vanes may be more clearly distinguished. The frames which support the vanes should be painted white or red, in order to make a better distinction betwixt them, and to show the vanes more clear.

One person is sufficient to manage a telegraph constructed on my plan, particularly at the two extreme ends of the stations, and when the telescope, as should always be the case, is fixed so near to the person who works the telegraph, that he may, at the same time, look through it, and also work the vanes; but for greater certainty, and for intermediate stations, where observations should be made with two telescopes, and in contrary directions, there should be two persons to relieve each other occasionally in the observations; this will require no particular genius, for any person will be capable to manage the business, who knows how to write numerals, and to add together 1, 2, 3, 4.

In trials which I have made for a year and a half, I have frequently employed children, who in a few hours have been sufficiently instructed, and capable of practice.

It is with this view that I have, in the construction of my telegraph, made some sacrifice in its power, to its simplicity of practice. In the working of my telegraph, six signals are usually given in one minute. For a more explicit explanation of this subject, I refer you to the two following publications, entitled, *Abhandlung om Telegrapher och Fiërsök til en ny Inråttning dëraf*, in the Swedish language, 1796, and *Traité des Télégraphes, et Essai d'un nouvel*

Sir A. N. Edelcrantz's Telegraph.

Fig. 1.

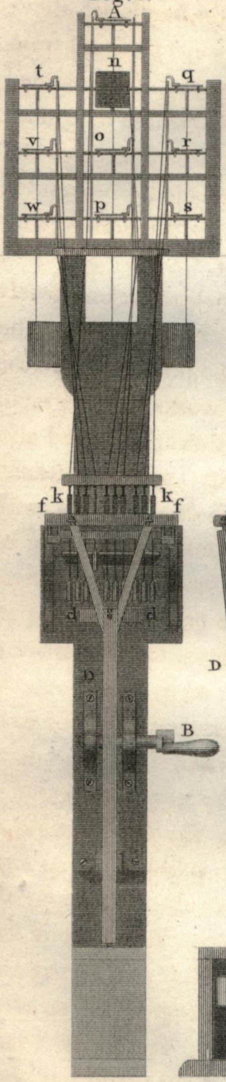


Fig. 2.

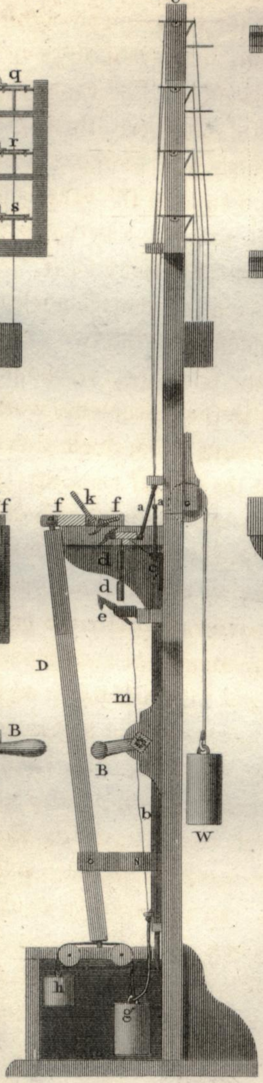


Fig. 3.

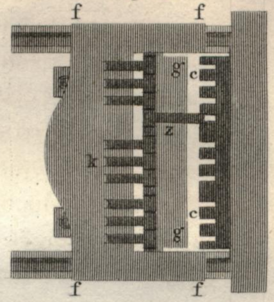
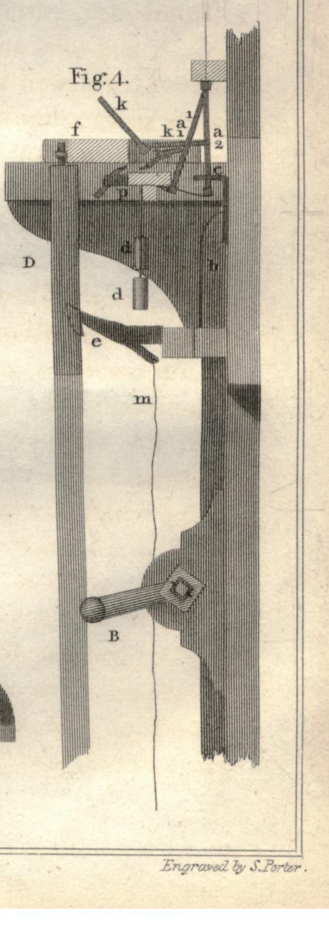


Fig. 4.



J. Farey, jun. del.

Engraved by S. Porter.

nouvel Etablissement de ce Genre, 1801, in the French language, where every circumstance relative to their construction and management is fully detailed, and will, I hope, be found very satisfactory.

I remain, dear Sir,

Your most obedient humble Servant,

A. N. EDELCRANTZ.

Stockholm, July 1, 1807.

To C. TAYLOR, M. D. SEC.

Reference to the Engraving of SIR A. N. EDELCRANTZ's *Telegraph. See Pl. V. Figs.* 1, 2, 3, *and* 4.

The telegraph, or that part of the machine by which the signals are made, is composed of three vertical rows of flat vanes or indexes, similar to those used in the English telegraphs. The middle row of indexes has four, A *n o p,* and the two outside rows three indexes each, q r s, t v w, the fourth of the middle row is above all the rest A. The machine for giving motion to these indexes is exhibited in Pl. V. figs. 1, 2, 3, and 4; each index has a crank to it, a line or wire is made fast to the crank, and comes down from the telegraph to the machine; *a a,* figs. 2 and 4, represent short cylindrical rods, having a button or knob screwed at each end; the above mentioned lines or wires, after passing through holes made in a fixed piece of wood, are fastened to the rods *a a,* figs. 1, 2, and 4, by means of the screwed buttons, and by drawing these down, the signal boards will be turned upright, but when the rods are released, the action of a weight attached to each signal board by a wire, turns the signal boards edgeways, as in figs. 1, 2, and 4; *b* is *b* is a wooden bar, which is drawn downwards by a rope coiled round a barrel turned by the winch B, and upwards by means of a weight W, fig. 2. The upper end of the bar *b*, has a piece of iron plate c, (a plan of which is seen in fig. 3), into which are cut slits to receive the rods *a a* above their lower knobs; and thus when the handle B is turned, it draws down the rods *a a*, and moves the signal boards, as shown at *n*, fig. 1. Each of the rods *a a*, has a small string and weight *d* attached to it by means of its lower screwed button, the action of which causes the rods to assume the position *a* 1, fig. 4; in this situation they are clear of the range of the iron plate *c*, and will not be affected though it is moved up and down. f f and c, (in all the figures, and seen in plans in fig. 3), is a frame sliding in grooves to and from the rods *a a*; it is moved by a lever D, which receives its motion in the following manner; a weight g, fig. 2, is fastened by a short rope to the end of the bar *b*, it is also tied to a rope which passes over a pulley, is then fastened to the end of the lever D, goes over another pulley, and has a weight *h* suspended from it; now, when the bar *b* is drawn up, it takes the weight *g* with it, the weight *h* then acts upon the end of the lever D, and throws the frame *ff* towards the rods *a a*; upon the descent of the bar *b*, the weight *g* is thrown upon the small rope, and as it is heavier than *h* is, draws it up, and moves the frame *f* from the rods *a a*. The frame *ff* has a spindle in it, upon which are mounted ten keys *k*, and which have angular gaps or notches in their ends, answering to the intervals of the rods *a a*. These keys are marked with figures, each denoting the signal board, whose rod *a a* is opposite to it; the keys turn on the spindles, and when turned up as k, in figs. 2, 3, and 4, are not in use, and do not affect the machine; but when any particular one is thrown down, as z, fig.

z, fig. 3, it pushes before it, in its angular notch or cleft, that rod *a* 2, fig. 4, which is opposite to it, into the correspondent slit in the plate *c*, as represented in fig. 4; a latch *e* catches the lever D, and prevents its return, though the bar b is drawn down by the handle A taking the rod *a* 2 with it, and making the signal; when the bar b arrives at the bottom of its motion, a wire *m* made fast to the end of the bar *b*, and to the tail of the latch *e*, raises the latch and allows the weight *g* to draw back the lever D and frame *ff*, into the position fig. 2; in its motion a small catch *p*, fig. 4, seizes a tail upon the plate *g*, (figs. 3 and 4,) which moves upon pivots in the frame *ff*; and as the frame recedes from the rods *a a*, the catch raises up the plate *g* upon its pivots, and thus lifts up all the keys which are in the position k 1, and puts them in the position *k*, ready for another signal. The great advantage of this contrivance is, that by the powerful leverage afforded by the winch and barrel, one man is enabled to move any number, or even the whole of the shutters at once, and to retain them in that situation, be the weather ever so boisterous, until the signal is answered; which is the more necessary in this telegraph, on account of its greater number of vanes or indexes; but which cannot be done in the government telegraphs in England, even with their more limited number of vanes, without employing several persons at each telegraph.

The SILVER MEDAL *of the Society was this Session voted to* MR. ROBERT RICHARDSON, *of Keswick, in Cumberland, for his Method of raising large Stones out of the Earth. The following Communications were received from him, an explanatory Engraving is annexed, and one of the Implements is preserved in the Society's Repository.*

GENTLEMEN,

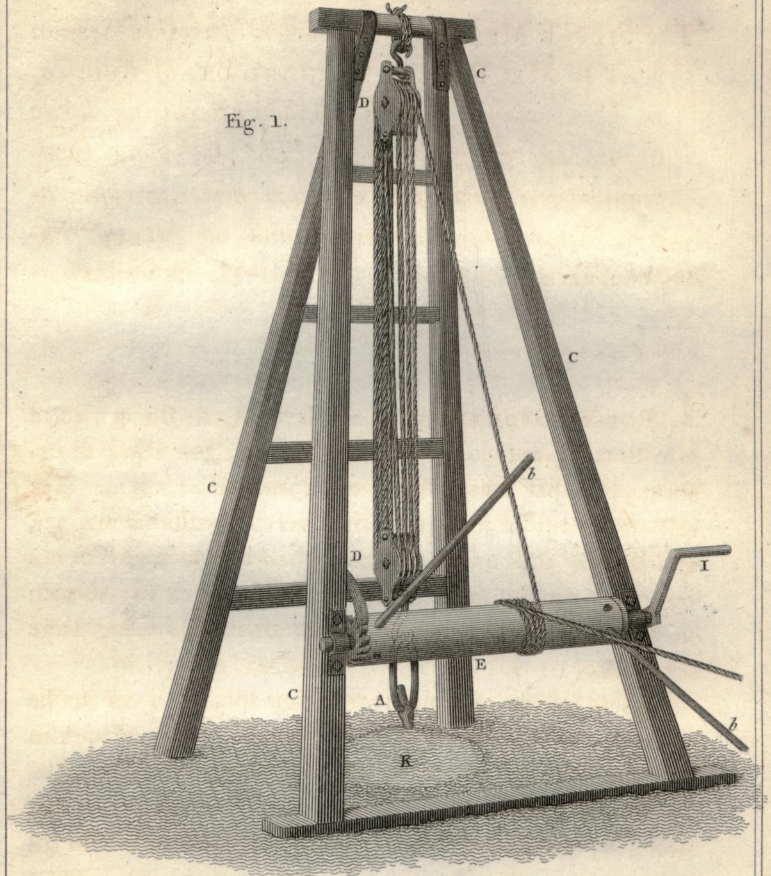
I, ROBERT RICHARDSON, of Keswick, in the parish of Crosthwaite, and county of Cumberland, beg leave to inform you, that I have found out a method of taking large self-stones out of the ground in a very expeditious manner, and that by this means two men will take as many stones out of the ground in one day, as would require twelve men in the usual way of blasting, and afterwards using large levers, &c.

Where stones of from two to four tons each are to be taken up, two men will raise as many as twenty men in the usual way. The work is done by the power of a tackle, but by my method of fixing the tackle to the top of the stone, by the plug which I have invented, it will hold till the stone is pulled out of the ground, and laid upon the surface, or upon a carriage, if required, all which can be done in a very little time.

Stones of four tons weight, or upwards, may be taken out of the ground within the time of five or ten minutes, by two men, without any earth or soil being previously taken from around them, or without any digging with hacks or spades. J. C. CURWEN, Esq. of Workington, has

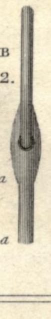
Mr. Richardsons method of raising large Stones out of the Earth.

Fig. 1.



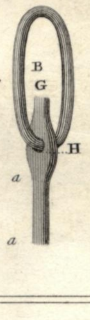
Front view

Fig. 2.



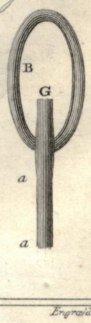
Perspective view

Fig. 3.



Edge view

Fig. 4.



J. Farey Junr. delin. *Engrav'd by S. Porter* has seen and approved of my performance with this invention, and if the Society should think it deserving of a premium, it would ever be gratefully acknowledged by

Gentlemen,

Your most obedient humble Servant,

ROBERT RICHARDSON.

Keswick, Feb. 8, 1808.

To the Society of Arts, &c.

DEAR SIR,

I CANNOT suffer Mr. RICHARDSON'S letter to be sent to the Society without adding a few lines concerning it. I can bear ample testimony to the ease with which the largest self-stones are lifted by his method. I have seen one upwards of five tons lifted by four men. One of the plugs is sent for the inspection of the Society. There is no difficulty in cutting the hole to receive it, the only care is not to make it too large. It is difficult to explain the theory of its action; the least stroke laterally disengages the stone. In many situations it is likely to be of great use, not only in drawing stones out of the ground, but in making weirs and embankments, where the stones are only to be lifted a moderate height.

One of my farmers in Westmoreland has made great use of one, and speaks of it in high terms. I have exhibited it to numbers of persons, who could not believe its power till they saw it tried.

Mr. Richardson submits its examination to the Society, and I conceive it will be very useful and beneficial in cases of new inclosures of land. I do not think it would answer for soft stones, or safe to use for raising stones in buildings, it being so easily disengaged by any lateral blow. By adding wheels to the tackle machine, or having it upon a sledge, a great deal of time and trouble would be avoided. I purpose to employ this method next summer in making an embankment against the sea; the facility it will give in raising and removing large stones, will expedite the work greatly. If any further certificates of the performance of this plug be required by the Society, I will with pleasure transmit them to you. I will answer for its extracting any stone not exceeding five tons weight out of the ground, without any previous moving of the earth; and it is of importance to preserve large stones entire.

I am, with respect, dear Sir,
Your obedient humble Servant,
J. C. CURWEN.

Workington Hall, Feb. 19, 1808.

To C. TAYLOR, M. D. SEC.

SIR,

I AM favoured with your letter, desiring my opinion of the utility of the iron plug invented by ROBERT RICHARDSON, of Keswick. That which I use is about six inches long, and one inch and a quarter in diameter; it requires a hole of its own size, only two inches deep; the plug is to be driven in a little short of the bottom, and will raise a stone of six or eight tons, with the assistance of three men, in the course of ten minutes after the hole is prepared; and I do not hesitate to say, that three men, thus furnished, will clear the ground of large stones in less time, and more effectually, than twelve men by any other method yet come to my knowledge. The plug should be made of good beaten iron. The simplicity and cheapness of the whole apparatus is a great object, as a good plug of the size I use will only cost two shillings and sixpence. I am fully of opinion, that by adding more and stronger ropes and pullies, work might be done by it to an amazing extent. I have reaped great advantage in my farm from the aid of the iron plug, and in justice to the inventor, am happy in thus vouching for its extreme usefulness. Several of my respectable neighbours have experienced the aid and benefit of the above instrument, and will vouch, if required, for the truth of the above statement.

I am, Sir,
Your truly obedient Servant,
ROBERT WRIGHT.

Rose Gill Hall, near Shap, Westmoreland,
May 9, 1808.

To C. TAYLOR, M. D. SEC.

Reference to the Engraving of MR. RICHARDSON'S *Invention for raising large Stones out of the Earth. See Pl. VI. Figs.* 1, 2, 3, *and* 4.

Fig. 1, K, shows the upper part of a stone nearly buried in the earth, having a hole made in it three inches and a half deep, and one inch in diameter, by means of a miner's jumper; the cylindrical tail of the plug *a*, figs. 2, 3, and 4, which is of the same size, is driven fast into it, by means of a hammer applied upon the head of the plug at G. This plug, in its whole length, is nine inches, and has a hole made in its broad part H, through which the oval iron ring B passes easily, and on which the plug can move backwards and forwards, when the ring is hung upon the hook of the lower pulley block of the lifting tackle. C C C C represent the four legs or frame work of the quadrangle; D a five-fold tackle, with blocks ten inches in diameter; E a roller seven inches in diameter, turned by two long iron levers b b; the handle I is used as a safeguard, and to assist to regulate the power of the levers. In fig. 1, the plug A is shown fixed in the stone K, ready to draw it out of the ground, by means of the lifting tackle.

N. B. The hinder legs of the quadrangle are made to close in between the fore legs, for the convenience of carriage.

The following Communication was received from MR. GILBERT GILPIN, *Old Park Iron Works, near Shifnal, relative to his Machine for raising Coals, described in page 74 of the 25th Volume of Transactions,*

SIR,

I AM sorry to see in the 25th volume of the Transactions of the Society of Arts, &c. that the engraver has in the plate put the wrong side of the machine for raising coal and ore to face the pit. Upon that plan the engine house would be between the machine and pit, and direct in the way of the chain. The cranks should face the opposite way.

There is also an error of the press, page 78, in describing the size of the cross section of the tire, which renders a confusion in the 11th, 12th and 13th lines. It ought to run thus, beginning at line 8 :

"The wrought iron tire is of two kinds, the one for "conical, and the other for cylindrical barrels; the cross "section of the former is nearly a parallelogram*, out of "the upper part of which about one fourth of an ellipsis is "taken, to form a horizontal bearing for those links of "the chain which lie flat upon the tire; the cross section "of the latter is a rectangle†."

I mentioned that I wished the manuscript which I first sent, to be superseded by that which I sent afterwards, but the following passages in pages 78 and 79, I find to be printed from the former, viz.

"It is probable, therefore, that in this manner of work- "ing, chains will last at least fifteen years, but to be cer- "tain we will take it at twelve in the subjoined compara- "tive statements, which show that the expense of chains "as cordage is only about a twenty-fourth part of that of "hempen ropes."

The comparative statement is printed from the last manuscript, (which was varied from the first one, to do away some objections of ropemakers, in regard to durability of ropes,) by which it appears, the expense of chains, as cordage, is only about a fourteenth part of that of ropes. I am pretty certain they will not be even one twenty-fourth of the expense; but it is necessary to correct the error which has arisen in the statements, from combining parts of each of the letters.

---

[*] One inch and a quarter, by 5-8ths of an inch.

[†] One inch and a quarter, by half an inch.

I purpose to transmit to the Society a description of an improved machine, which is likely to be of much importance on board men of war and Indiamen.

I am, Sir,
Your obliged humble Servant,
GILBERT GILPIN.

Old Park Iron Works,
July 6, 1808.

To C. Taylor, M. D. Sec.

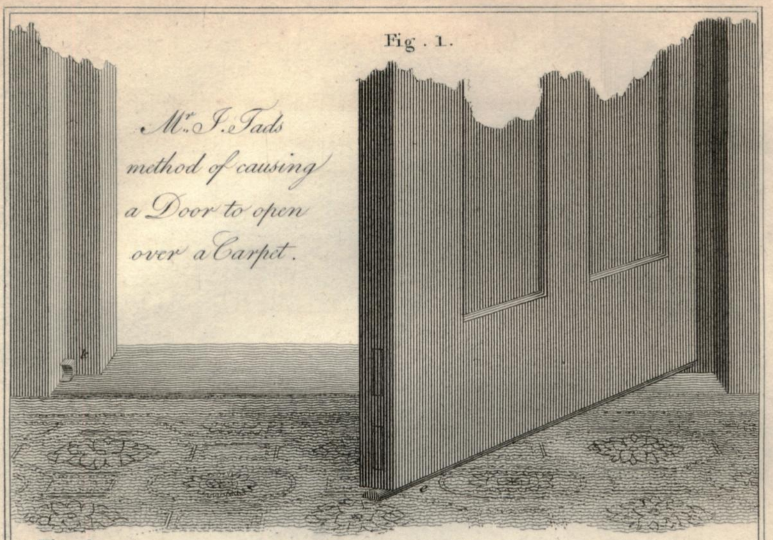
Five Guineas *were this Session voted to Mr.* John Tad, *of Little Hermitage, Wapping, for a Method of Preventing Doors from Dragging on Carpets. The following Communication was received from him, an explanatory Engraving is annexed, and a Model, showing this Invention, is preserved in the Society's Repository.*

SIR,

I have taken the liberty of laying before the Society a model of my invention to prevent doors from dragging on carpets, and to keep out the current of cold air, which enters under such doors as are not close to the carpets underneath them.

I can affix this machinery to the bottom of any door, so that the door shall pass over the carpet with ease, and, when shut, be air tight. It obviates the necessity of screw rising hinges,

Fig. 1.



Mr. J. Tad's method of causing a Door to open over a Carpet.

Fig. 2.

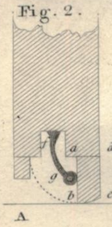


Fig. 3.

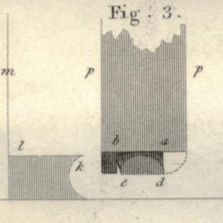
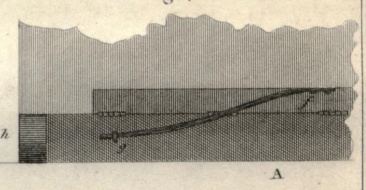


Fig. 4.



Mr. W. Barlow's Wrench for Screw nuts of any size.

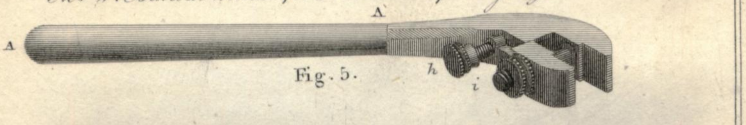


Fig. 5.

Section

Enlarged view of the head

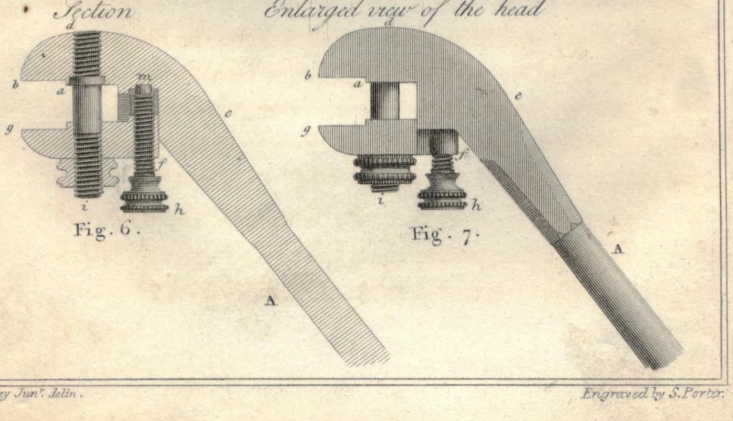


Fig. 6.

Fig. 7.

J. Farey Junr. delin.
Engraved by S. Porter.

hinges, and is less expensive than other inventions for the same purpose.

The machinery is constructed of a slip of well seasoned beech wood, equal in length to the width of the door; this slip is one and a quarter inch wide, and half an inch thick, and to be covered with green cloth on the inside; it is to be hung to the bottom of the door with three small brass hinges, and is drawn up by a concealed spring as the door opens, and is forced down when the door shuts, by one end of it, which is semicircular, pressing upon a concave semicircular piece of hard beech wood, fastened at the bottom of the door case, and which holds it down close to the floor or carpet, so as to exclude the air from entering under it. Hoping this invention will meet with the approbation of the Society, I remain, with respect,

Sir,

Your most humble Servant,

JOHN TAD.

No. 4, Little Hermitage Street, Wapping,
Nov. 24, 1807.

To C. TAYLOR, M. D. SEC.

A Certificate was received from Mr. WILLIAM FRENCH, No. 280, Wapping, stating, that John Tad had fixed to two of his room doors the invention above mentioned, and that he found it to answer to his satisfaction, both in permitting the doors to pass clear of the carpets, and in keeping out the air.

Refer-

Reference to Mr. Tad's *Method of preventing Doors from Dragging on Carpets. See Pl. VII. Figs.* 1, 2, 3, *and* 4.

Mr. Tad's invention consists in first cutting away the bottom of the door, so that it is about one inch and a quarter above the floor; this allows a sufficiency of room for the door to open over any carpet; to close the opening which would now be left under the door when shut, he proposes to fix beneath the door, by means of hinges, a slip of wood, of which *a b d e*, figs. 2 and 3, Plate VII. is a section. Fig. 1 is a perspective view of the bottom of a door, with the invention annexed to it; fig. 2 is a section across the door when closed; fig. 3 is a view of the edge of the door when open; and fig. 4 is a section supposed to be made by cutting the door in two parts, edgeways. The hinges, on which the slip turns, are fixed to the edge. In figs. 2 and 3, from *a* to *b*, is exactly one inch and a quarter, so that when the ruler is turned down upon the hinges, it reaches the floor A A as in fig. 2; in the other direction *a d* it is much less, being only half an inch, so that when it is turned up under the door, as in fig. 3, it leaves three quarters of an inch clear of the floor. It now remains to show how the ruler is turned up or down; it has always a tendency to rise up into the state of fig. 3, by the action of a steel wire spring, shown in figs. 2 and 4, which is concealed in a rebate cut in the bottom of the door; one end of the wire is screwed fast to the door at *f*, the other is inserted into an eye fastened into the slip at *g*, to throw it down into the position of figs. 2 and 4. The end *h*, fig. 4, of the slip farthest from the hinges of the door, is cut into a semicircle, as seen in fig. 3. When the door is just closed, this semicircle is received into a fixed concave semicircle *k*, fig. 3, cut in the end of a piece of wood *k l*, made fast to the door case; the line *m l*, fig. 3, represents the plane of the door when shut, and *p p* part of the door seen edgeways; as the door in shutting moves from *p* to *m*, the semicircular end of the slip *a b d e* presses against the end of the piece *k l*, and as the door proceeds, it turns down as in fig. 2, so that by the time the door is shut, the slip is turned quite down; the edge *e b* of the slip is cut into a segment of a circle struck from the hinges on which it turns. The perspective view in fig. 1 shows that this contrivance, applied to any door, will not offend the eye, as it can scarcely be distinguished from an ordinary door. *K*, fig. 1, shows the concave semicircle of the piece of wood fastened to the door-case, in which the semicircular end of the slip *e* is to be received.

FIVE GUINEAS *were this Session voted to Mr.* WILLIAM BARLOW, *of his Majesty's Dock Yard, at Portsmouth, for an Improved Screw Wrench to fit different sized Nuts or Heads of Screws. The following Communications were received from him, an explanatory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

DEAR SIR,

I SEND you a screw wrench, from the inventor, WILLIAM BARLOW, with his observations upon it. I have employed him as a foreman during the erection of the block machinery in his Majesty's Dock Yard, at Portsmouth.

If this very useful instrument should meet with the approbation of the Society of Arts, &c. I shall beg leave to recommend the inventor to their notice, as an intelligent and ingenious person, who is deserving of their encouragement.

I am, dear Sir,
Your obedient humble Servant,
M. J. BRUNEL.

No. 21, *Cheyne Walk, Chelsea,*
March 7, 1808.

To C. TAYLOR, M. D. SEC.

SIR,

PERMIT me to make a few observations on a shifting screw wrench of my invention, which I beg leave to lay before the Society of Arts, &c. through the hands of Mr. Brunel, inventor of the block machinery here.

I have found, from long experience, the imperfections of the various wrenches in common use, for the screw heads and nuts of engines in general, which are often materially injured for want of an instrument which would fit variety of sizes, and be applied with as much advantage as a solid wrench. I have had it in view to unite steadiness with conveniency in making such an instrument, and flattering myself that I have obtained both, I am desirous to communicate my invention to the Society, and have therefore sent an instrument on the principle I have actually used, and which has met with the approbation of my employers and other persons.

This wrench, by means of a nut and screw, is adjusted with the greatest ease to the exact size required, and in that state rendered so steady that in use it is found equal to a solid wrench.

I have, for several years, been intrusted with the care and repairs of many valuable engines of various descriptions, composing the block machinery in this dock-yard, and I have always considered it as an object of great importance, for the preservation and neat appearance of engines, to attend to all the means which would obtain these advantages, and such, I think, will arise from the use of my universal wrench.

It is, perhaps, unnecessary to point out, that a wrench on this principle, may be varied in its form and size so as to be rendered probably more convenient for some particular purposes for which such instruments are required.

I am, Sir,
Your obedient Servant,
WM. BARLOW.

Portsmouth Dock Yard,
March 1, 1808.

To C. TAYLOR, M. D. SEC.

Reference to the Engraving of Mr. BARLOW'S *Improved Wrench. See Plate VII. Figs.* 5, 6, *and* 7.

This instrument is represented in Pl. VII. Fig. 5 is a perspective view of it; fig. 6 a section of its head; and fig. 7 an external representation of the head. The screw head or nut to be turned is held between two jaws, one of which *a b d e* is forged in the same piece with the handle A A, the other, *f g*, is moveable between two chukes, and fastened to the fixed jaw by the strong screw *i*, which is fixed to the same jaw, passes through the moveable one, as shown in the section fig. 6, and has a nut screwed upon it; the

other

other screw *h*, is tapped through the moveable jaw, and its point presses upon the bottom of a cavity made in the fixed jaw shown at *m* in the section fig. 6. To make the wrench fit any particular screw head or nut, the nut upon the strong screw *i* must first be loosened, and the screw *h* screwed in or out of the moveable jaw, until the opening *b g* is just the proper width to receive the screw head or nut to be turned by the wrench; the nut of the screw *i* is then to be screwed down, until it presses upon the jaw, and holds it perfectly tight.

The THANKS *of the Society were this Session voted to* MR. SAMUEL CLEGG, *of Manchester, for his Apparatus for making Carbonated Hydrogen Gas from Pit Coal, and Lighting Factories therewith. The following Accounts were received from him, an explanatory Engraving is annexed, and Drawings are preserved in the Society's Repository. A* SILVER MEDAL *has since been voted to him for the Communication.*

DEAR SIR,

WHEN your son was in Manchester, he called to see my nephew's, SAMUEL CLEGG's, improved gas lights, and was desirous to have a plan of his method, which my nephew promised to him, and I undertook to get it conveyed to you. I have, accordingly, taken the opportunity of sending to the Society of Arts, &c. a plan and explanation of his apparatus.

He lighted a large factory in Yorkshire some years ago upon this principle, and has since lighted some buildings in this neighbourhood, and I believe he is the first person who succeeded in rendering these lights free from the offensive smell which generally accompanies them. My nephew served an apprenticeship to Messrs. Boulton and Watt, of Birmingham, in the steam-engine business, in which he is now engaged here on his own account, and has made considerable improvements in their construction.

I remain, dear Sir,
Your most obedient Servant,
ASHWORTH CLEGG.

Manchester, May 18, 1808.

To C. Taylor, M. D. Sec.

SIR,

Your esteemed favour I have received, and, according to your request, have sent you a fuller explanation of the gazometer and lamp, accompanied with further drawings.

A gazometer, containing seven hundred cubical feet of gas, weighs about twenty hundred weight, and costs about two pounds ten shillings the hundred weight.

The whole of an apparatus complete, capable of supporting forty lamps for four hours, each lamp affording light equal to ten candles of eight in the pound, will cost about two hundred and fifty pounds. Each lamp consumes six cubical feet of gas per hour. I am happy to find that the Society have honoured my communications with their attention, and I remain, with great respect,

Sir,
Your most obedient Servant,
S. CLEGG.

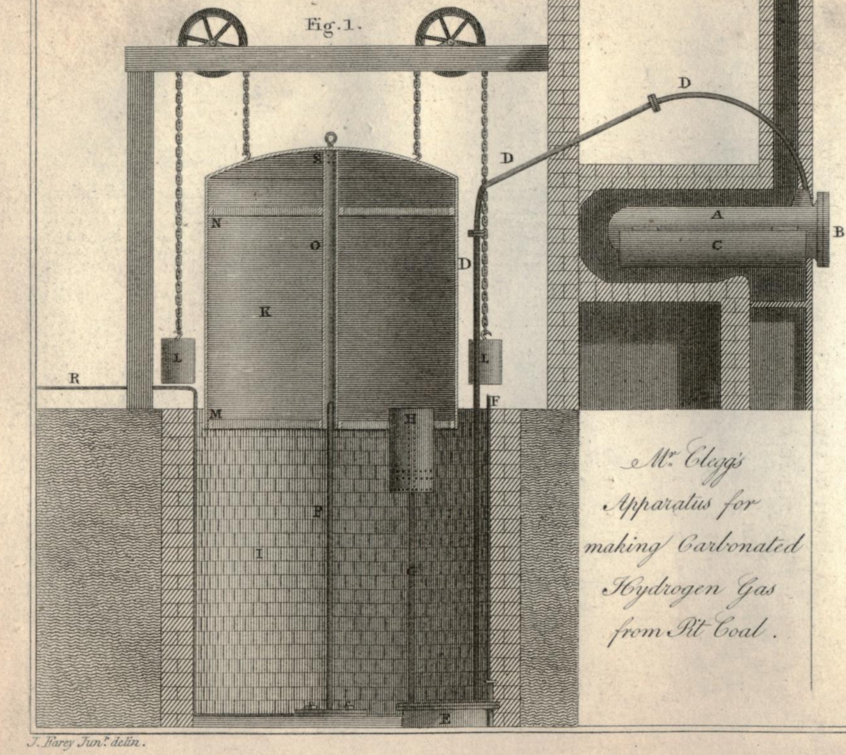
Manchester, Aug. 12, 1808.

To C. Taylor, M. D. Sec.

Reference to Mr. S. Clegg's *improved Apparatus for extracting Carbonated Hydrogen Gas from Pit Coal. See Plate VIII. Figs.* 1, 2, 3, 4, 5, *and* 6.

In fig. 1, *A* shows the cast iron retort, into which are put the coals intended to be decomposed by means of a fire underneath it, the heat of which surrounds every part of it, excepting the mouth or part by which the coals are introduced. The lid or iron plate *B*, which covers the mouth of the retort, is ground on air tight, and fastened by means of a screw in the centre; *C* is a shield or saddle of cast iron, to preserve the retort from being injured by the intensity of the fire underneath it, and to cause it to be heated more uniformly. *D D D* represents the cast iron pipe which conveys all the volatile products of the coal to the refrigiratory of cast iron *E*, in which the tar, &c. extracted from the coal is deposited, and from whence they can be pumped out by means of the copper pipe *F*. *G* is the pipe which conveys the gas to the top of the cylindrical vessel or receiver *H*; this receiver is air tight at the top, and consequently the gas displaces the water in the vessel *H*, to a level with the small holes, where the gas is suffered to escape and rise through the water of the well *I*, into the large gazometer *K*. The use of the vessel *H* is pointed out as follows, viz. If the pipe *G* reached all through the water, without passing into the vessel *H*, the gas would not be rendered pure or washed; and if part of the pipe did not rise above the water, the water would have free communication with the tar, besides exposing the retort *A* to a very great pressure, so as to endanger its bursting when red hot. This vessel or receiver *H*, in a large apparatus, is about eighteen inches diameter, and two feet long; the quantity of gas, therefore, which it contains, is sufficient to fill the pipes

Fig. 1.



Mr. Clegg's Apparatus for making Carbonated Hydrogen Gas from Pit Coal.

Horizontal Section of the Gazometer at the bottom part.

Fig. 2.

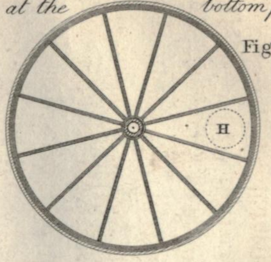


Fig. 4.

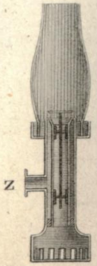


Fig. 5.

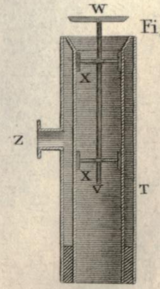


Fig. 3.

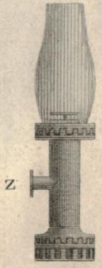
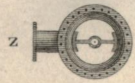


Fig. 6.



J. Farey Junr. delin.

Engraved by S. Porter.

pipes and retort when cool, and prevents the pipe *G* from acting as a syphon, and exposes the gas to the water without endangering the retort.

When the operation begins, the upper part of the cylindrical gazometer *K*, fig. 1, made of wrought iron plates, is sunk down nearly to a level with the top of the circular well *I*, and is consequently nearly filled with water, but it rises gradually as the gas enters it and displaces the water; the two weights *L L* suspended over pullies by chains keep it steady and prevent its turning round, otherwise the lower stays *M* of the gazometer would come into contact with the vessel *H*. There are two sets of these stays, one shown at *M*, and the other at *N*.

There is also an iron pipe *O* made fast in the centre of the gazometer, by means of the stays which slides over the upright pipe *P*, by which contrivance the gazometer is kept firm and steady, when out of the well; it likewise prevents the gas from getting into the cast iron pipe *P*, and the copper pipe *R*, any where but through small holes made in the pipe *O* at *S* at the top of the gazometer, where the gas is perfectly transparent and fit for use.

The pure gas enters the tube *O* at the small holes made in its top at *S*, and passes on through the tubes *P* and *R* to the lamps, where it is consumed and burnt.

The seams of the gazometer are luted to make them air tight, and the whole well painted inside and out, to preserve it from rust.

Fig. 2 shows an horizontal section of the lower hoop of the gazometer *K* at the part *M*, with its stays or arms, and the manner in which the iron pipe *C*, before described at fig. 1, sliding on the tube *P*, passes through the ring in the centre of the hoop; an horizontal section of the receiver *H* appears therein.

Fig. 5 shows a section of one of the gas lamps; the space between the outer tube *T* and the inner tube *V*, is to be filled with gas supplied by the pipe *R*, shown in fig. 1, where a stop cock is inserted for adjusting the flame, which gas passes through a number of small holes made in the outer edge of a circular plate shown at fig. 6, which unites the tubes *T* and *V* at their tops. *V* is the inner tube which conveys the atmospheric air into the centre of the flame; the upper part of this tube is made conical, or widening outwards, to join a circular plate with holes in it, a horizontal view of which is shown at fig. 6. *W* is a button, which can be placed at a small distance above the mouth of the lamp, and its use is to convey, in an expanded manner, all the air which rises through this tube to the inner surface of the flame, which assists the combustion very much; this button may be set at any convenient distance above the tubes of the lamp, as it slides in the cross bars *XX*, by which it is supported in the inner tube.

A current of air also passes between the glass tube or chimney and the outer tube *T*, through holes made in the bottom of the glass-holder, as in Argand's lamps; this surrounds the flame, and completes its combustion, as explained by the view, fig. 3, and section, fig. 4, which have a glass upon each. *ZZZZ*, figs. 3, 4, 5, and 6, show the tube through which the lamp is supplied with gas from the pipe *R*, fig. 1.

TEN GUINEAS *were this Session presented to Mr.* **HENRY WARD,** *of Blandford, in Dorsetshire, for a Crank useful in working Telegraphs. The following Communications were received from him, an Engraving is annexed, and a complete Model is preserved in the Society's Repository.*

SIR,

BEING one day at the telegraph on the Blandford station, I observed a great inconvenience to attend the working of it in windy weather, and many errors occasioned in consequence. I have since made a model of a crank, which will perfectly remedy these defects, and have herewith sent the model for the inspection of the Society, trusting it will meet their approbation.

I am, Sir,

Your most obedient Servant,

H. WARD.

Blandford, April 20, 1807.

To C. TAYLOR, M.D. SEC.

Reference to the Engraving of Mr. HENRY WARD'S *Crank for Telegraphs See Pl. IX. Figs.* 1 *and* 2.

A front view of this is shown in fig. 1, and a side view in fig. 2. The signal board *a a a a* of the telegraph is of the usual kind, the improvement consists in the crank for moving and retaining it. The spindle the board *a a* turns upon, has a small wheel *b b* upon it, to which two segments *d d*, &c. are attached by means of a piece of steel spring fixed at *e*, which always causes the segments to recede from the wheel; the segments have grooves in their peripheries to contain two cords *f* and *g*, by which the signal board *a a* is moved; each segment has a notch in it at *h* and *i*, which notches are a quarter of a circle from each other; *k* is a piece of iron projecting from the frame of the machine, when the signal board is set upright, as in the figures; the notch at *h* receives the piece of iron *k*, and as the segment is pressed towards it by the spring at *e*, by which the segment is fastened to the wheel, it is plain that the force of the wind acting upon the board cannot turn it, as it is locked fast; but when the operator pulls the cord *f*, it draws the segment *d* close to the wheel *b*, this unlocks the wheel, and the signal board is at liberty to be moved by the cord *f* edgeways, when the notch at *i* in the other segment *e* receives the piece of iron *k*, and holds it until again moved to its original position, by means of the cord *g*, which acts in the same manner as *f*.

Remarks on his Compensation Pendulum.

SIR,

In looking over the description of my pendulum, described in the twenty-fifth volume of the Society's Transactions, I perceive there is an error committed, which, if not corrected, will greatly perplex the reader. In page 118, line 1 and 2, it stands thus: "This screw turns in the rod *h h*, passes through the zinc rod *k k*, and screws into the iron rod *i i*." Now the fact is, that the screw does not enter the iron rod *i i* at all, but goes no further than barely through the zinc rod. It ought, therefore, to read thus: "This screw is tapped into the rod *h h*, but that part of it "which enters the zinc rod *k k* has the threads turned off, "and passes barely through that rod."

I am, Sir,

Your very obedient Servant,

HENRY WARD.

Blandford, August 3, 1808.

To C. TAYLOR, M.D. SEC.

The GOLD MEDAL *of the Society was this Session voted to Captain* GEORGE WILLIAM MANBY, *of Yarmouth, Norfolk, for a Method of preserving the Lives of shipwrecked Persons, and forming a Communication with Ships stranded, by means of a Rope thrown over the Vessel from a Mortar on Shore. The following Accounts were received from him, two explanatory Engravings are annexed, and Models are preserved in the Society's Repository.*

SIR,

WHEN I was last in town, I had the pleasure of meeting you, and saying it was my intention of submitting to the Society of Arts, &c. my invention of saving people from a vessel stranded on a lee shore. I have had the pleasure of putting it in practice with a success beyond what my expectation led me to hope, and I shall take the liberty of sending you the papers in a few days.

I am, Sir,
Your most obedient
Very humble Servant,
GEO. W. MANBY.

Yarmouth, Norfolk, March 4, 1808.

To C. Taylor, M. D. Sec.

SIR,

I request you will do me the honour to lay before the Society for the Encouragement of Arts, Manufactures, and Commerce, the various papers herewith transmitted, respecting my invention for throwing a rope a given distance to a ship stranded on a lee shore, whereby an apparatus can be used to rescue the crew, &c. The idea was suggested from the numerous melancholy events of shipwreck that have happened on this part of the coast, within a short distance of the shore; these determined me to make it a favourite pursuit, and I resolved to persevere in it, until some happy mode succeeded effectually to give assistance on similar occasions. From the distressing day when his Majesty's gun brig, Snipe, came on shore within fifty yards of the beach, when no communication could be procured, I have been making innumerable experiments, but unable to carry them to the extent wished, until the Right Honourable Board of Ordnance did me the honour, on my application to them, to supply such a piece of ordnance, stores, and apparatus, as appeared best calculated to complete my views. They have likewise further complied with my request, and the dangerous stations of Cromer, Happisbro', Winterton, Lowestoffe, and Orfordness, are to be immediately supplied.

The service can be performed in a quarter of an hour from the time of the mortar coming opposite the vessel in distress, when the persons are initiated in the several uses. Models explanatory of its performance I request you will do me the honour to place, for the use of the public, in the Repository belonging to the Society; and as a painting of the subject will convey a clearer idea of the service, and extent of the invention, than it is possible for me to describe, I have directed one to be brought for the inspection of the Committee.

I have the honour to be, Sir,
Your most obedient,
Very humble Servant,
GEO. WM. MANBY,
Captain, B. M. Yarmouth.

Yarmouth, Norfolk, March 28, 1808.

To C. TAYLOR, M. D. SEC.

DEAR SIR,

I HAVE the honour, as Secretary to the Suffolk Humane Society, as well as by the desire of many other persons who attended your experiments at Lowestoffe on the 26th of August, and the 10th of September, to transmit to you their unanimous vote of thanks. I have also added some minutes which I took at the time of those experiments. It gives me peculiar pleasure to find, that those for whose benefit the experiments were principally undertaken, namely, sailors, are fully convinced of the advantage of the plan you have adopted for securing a communication between the shore and a stranded vessel.

I remain, Sir,
Your obedient humble Servant,
M. MAURICE,
Secretary of the Suffolk Humane Society.

Normanstone, Sept. 21, 1807.

To CAPTAIN MANBY, Yarmouth.

Minutes respecting the Suffolk Humane Society at Lowestoffe.

August 26, and September 10, 1807.

Rev. I. G. SPURGEON, V. President, } in the Chair.
Rev. BENCE BENCE, Treasurer. }

ON both occasions, it was unanimously resolved;

1st. That in the opinion of the Suffolk Humane Society, as well as of that of many other gentlemen present, that Captain Manby's experiments for effecting a communication between the shore and a stranded vessel, made by throwing a shot with a rope, appended to it over the vessel, if she be near land; or by a grapnel thrown from a mortar, by which a boat can be hauled over the surf, have completely answered the purpose for which they have been attempted.

2dly. That the Thanks of the meetings be given to Captain Manby, for the zeal and exertions he has shown to promote the object, for which the Suffolk Humane Society was instituted.

3dly. That these resolutions be published in the county papers, signed by M. Maurice, Secretary.

Minutes

Mr. H. Ward's Crank for a Telegraph.

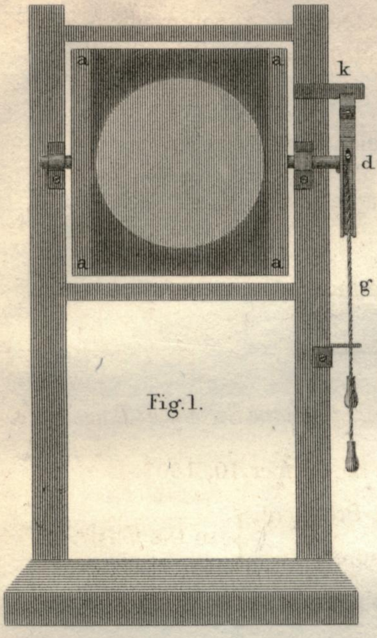


Fig. 1.

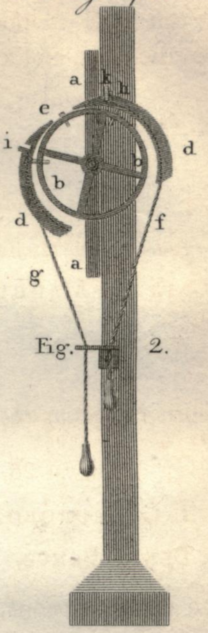


Fig. 2.

Capt. Manby's method of relieving Shipwrecked Seamen.

Fig. 3.

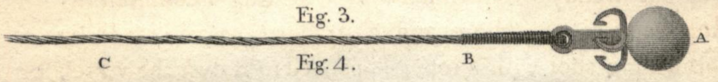
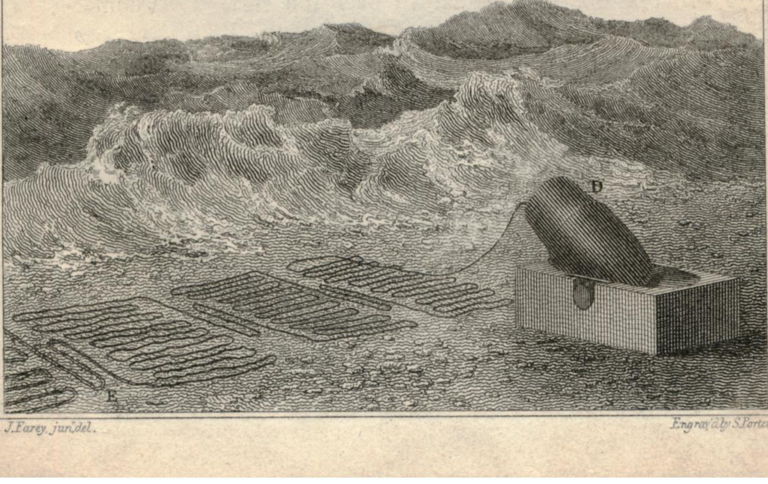


Fig. 4.



J. Farey, jun. del.
Engrav'd by S. Porter.

Minutes of Captain MANBY'S *Experiments at Lowestoffe, August 26th and September 10th,* 1807.

A cohorn of four inches and a half bore, weighing three quarters of a hundred weight and one pound, at thirty-five degrees elevation, loaded with four ounces of gunpowder, threw a round shot weighing eleven pounds and a half, to which was fastened a hided rope, and a large deep-sea line, to the distance of one hundred and eighty yards.

At an elevation of thirty degrees to one hundred and eighty eight yards, a field piece of five inches and a half bore, threw a round shot, barbed at the top, weighing thirty pounds, fastened to a whale rope one inch and a half, to the distance of one hundred and ninety yards; the elevation was twenty degrees and a half, and a charge of eight ounces of powder.

The same piece, elevated twenty-five degrees, with a charge of ten ounces of powder, threw a shot similar to the last two hundred yards.

The grapnel with extended flutes, weighing forty-two pounds, and the same rope as before, the piece at an elevation of twenty-two degrees, and a charge of ten ounces of powder, was thrown one hundred and ninety yards. A boat was hauled over the surf, by pulling at the line fastened to the grapnel, which she went to, took up, and returned again to the shore.

M. MAURICE, SEC.

CERTIFICATES.

Norfolk, Great Yarmouth.

JOHN PROUTING, late master of the brigantine or vessel called the Elizabeth of Plymouth, maketh oath and saith, that he was on board the said vessel, when she was unfortunately stranded on the beach of Great Yarmouth aforesaid,

said, in a violent gale of wind, on Friday the 12th day of February instant. That a rope from the shore was thrown by a piece of ordnance to the distance of one hundred and fifty yards, over the said vessel, and lodging upon her rigging, at which time no other communication could be obtained; and by means of which rope so thrown, he solely attributes the safety of himself and crew. That he could not at the time have used a piece of ordnance, or any rope on board for effecting a communication with the shore, from the rolling of his said vessel and the sea making continual breaches over her; and that the deponent is fully convinced that the invention of throwing a rope to a ship or vessel stranded on a lee shore, is of the utmost consequence and importance to a maritime and commercial country, and interesting to the world at large.

JOHN PROUTING.

Sworn at Great Yarmouth aforesaid, this 22nd day of February, 1808, before me,

EDMUND K. LACON,
Mayor of the Borough of Great Yarmouth.

JOHN YARLEY, Midshipman-gang, and JAMES CLERK late Serjeant of the Cambridge Regiment of Militia, stated, that they were present when Captain Manby effected a communication between the shore and the Brig Elizabeth, in the violent storm of the 12th of February 1808, by means of a rope thrown from a mortar over the vessel, by which rope the people from the beach hauled a boat through the surf to the vessel, and brought out the crew, consisting of the master and four men; and they firmly believe, as stated by the said master, John Prouting, that the safety of him and his crew were solely to be attributed to Captain Manby's invention of throwing a rope to their assistance.

Copy of a Letter from I. B. HUNTINGTON, *Esq. one of his Majesty's Justices of the Peace for the County of Norfolk, to Captain Manby.*

DEAR MANBY,

PERMIT me to congratulate you on your very successful and excellent experiments, made on Winterton Beach, last Wednesday, by your invention, of saving lives in actual shipwrecks, and to express my entire conviction, that hereafter it will be the means of saving many lives. I have lived in this place upwards of twenty years, and in that time witnessed many dreadful scenes. I can, with the greatest truth, affirm, to have known upwards of one hundred persons to have perished, the greater part of whom might have been saved, had your truly ingenious invention been on the spot. It gave me great pleasure to see the praiseworthy and active part the men on the beach that day evinced, and from whose future exertions much good is to be anticipated.

It has been mentioned to me, that your invention had been before tried, and a premium for the same given by the Society for the Encouragement of Arts, in consequence of which I looked into the records of that Society, and find that in 1791, experiments were made at Woolwich, by Lieutenant Bell, of the Royal Artillery, to throw a rope from a mortar placed in a boat on the river, by which he hauled himself and another person to the shore, on a raft, floated by four casks. I can by no means think this bears any analogy to yours, as every one at all acquainted with the state of a vessel shipwrecked, and the boisterous sea and wind usually attendant, must know the impossibility of such a method being by any means practicable.

The invention of your barbed shot will very often be of the greatest benefit, when, from the severity of the weather, the seamen are rendered incapable of assisting themselves, as your boat, which is, in my opinion, the best I have seen, may be then hauled from the beach. Although your grapnel is not yet brought to perfection, still, from your persevering disposition, I flatter myself that useful part of your apparatus will not be long wanted. As no one knows the necessity of this mode of saving lives more than myself, I most earnestly hope the same will meet with encouragement from the public, and that you may receive the due reward of your merit, is the wish of

Dear Sir, yours truly,

I. B. HUNTINGTON.

Somerton, March 5, 1808.

To G. W. MANBY, Esq.

Minutes of Experiments made by Captain MANBY *at Winterton, March 2,* 1808, *certified by* I. B. HUNTINGTON, *Esq. one of his Majesty's Justices of the Peace for the County of Norfolk.*

A galloper carriage conveyed from Yarmouth to Winterton the following stores, viz.

One five and a half inch royal mortar on its bed; two ammunition boxes filled; two hundred fathom of one inch and a half rope; two hundred fathom of deep-sea line; twenty fathom of one and a half inch rope, fitted up with two blocks, as a gun-tackle purchase; three iron shod stakes; a large maul to drive them with; a cot fitted up on a stretcher, with gudgeons and fore-lock pins, to convey people on shore; two round twenty-four pounder's shot, with eyes, to form communication; one shot with barbed short flukes to catch the rigging of a vessel, for the purpose of hauling a boat off, when the crew are so benumbed with cold or fatigue, that they are incapable of assisting in the plan intended for their relief; one grapnel forty-two pounds weight, to haul a boat over a high surf to get off to ships in distress at a distance from the shore.

The carriage thus loaded travelled with considerable ease, accompanied by two men seated on the ropes, and was found capable of going with two horses at the rate of eight miles an hour. The mortar being laid at the angle of twenty-two degrees and a half (which was found to give the greatest range with a rope if projected against the wind,) threw a deep-sea line with

4	ounces of powder	140 yards
6	do.	182
8	do.	215
10	do.	249
12	do.	290
14	do.	310
16	do.	322

The barbed shot at the same angle, with sixteen ounces of powder, carried two hundred and forty-six yards of one inch and a half rope.

The grapnel, with the same rope as the last, with sixteen ounces of powder, was blown to pieces, but the same grapnel had been thrown at Lowestoffe, on the 10th of September preceding, one hundred and ninety yards, with ten ounces of powder, and was found to answer every purpose of its invention.

I do certify the above was made in my presence,

I. B. HUNTINGTON.

DEAR SIR,

I BEG leave to express my pleasure and great gratification, from the experiments which you did me the favour to make yesterday, at Caistor, in my presence, and in the presence of the principal inhabitants of that parish, most of whom have from their infancy resided there, and have been eye witnesses of many sad scenes of shipwreck, which have occurred on their beach, and all of whom (I believe) expressed their thorough conviction, that had the experiments tried yesterday, been within their reach on those agonizing occasions, they might now exult in the glorious reflection of having rescued numbers of their fellow-creatures from an untimely and watery grave. This seemed to be the universal and concurrent opinion of all present yesterday. For my own part, having lived more than thirty years upon the sea coast, I feel no hesitation to add mine to the many respectable testimonies in your possession of the efficacy of your invention, and that by affording a certain and safe communication between the shore and the distressed vessel, you have provided the means of escape to numbers of forlorn, and otherwise lost mariners, even where a life-boat should not be able to reach the vessel's side. But I firmly believe that hardly in any case *this* will be prevented; for I am persuaded that the round shot with barbed points, having been thrown over the ship, and drawn back by the people on shore, (even if the wretched sufferers were so enfeebled or benumbed as to render no assistance,) would lay such hold on the sides, or rigging, as would enable the men in the life-boat to keep the boat's head at right angles with the opposing wave; and that they would, in spite of the most outrageous surf, reach the vessel. This (I am almost confident) might, and would be effected, and for the accomplishment of it, your country, Sir, is your debtor. In short, whether the invention originated with you or not, certain it is, that through *your* means it is become *practicable*, and may be rendered subservient to the noblest purposes,

poses, that of saving the lives of our fellow creatures; and, in particular, of many of that ever to be respected body of men, the British seamen.

I am sure, Sir, that the labour and attention which you have bestowed on this highly important subject, will ever afford you the most heartfelt satisfaction; but, Sir, it is entitled to something more, it is entitled to your country's gratitude, which gratitude I most sincerely wish may be expressed by an ample remuneration.

That you may long experience the benefits of your praiseworthy exertions *externally*, as I am sure you must from self-complacency *internally*, is the sincere wish of,

Dear Sir,

Your obliged and obedient Friend and Well-wisher,

B. W. SALMON,

Rector of Caistor, and one of his Majesty's Justices
of Peace for the County of Norfolk.

Ormesby, March 8, 1808.

To G. W. MANBY, Esq.

SIR,

I HAVE witnessed your experiments at Winterton, and having been bred to the sea, twice shipwrecked on the neighbouring shore, and fourteen years resident on the east coast of Norfolk, I know the value of such a communication in distress or shipwreck. Not a winter has passed during the time above mentioned, without several wrecks having been driven on shore, and the greatest part of their crews having perished, for want of relief or aid from the shore. I assure you, that if your experiment had been practiced on February 18, 1807, several lives would certainly have been saved on this coast. I was one of the spectators on the beach at Hasbro', when the Hunter cutter was lost, and although she was within 150 yards of the cliff, no assistance could be given her;—likewise the Abcona of Sunderland. It is in fact too tedious to mention the different ships which I have witnessed being wrecked within the fourteen years I have resided on the coast, and all the hands lost.

The misfortune of this coast is, that when the wind blows strong to the northward, the sea runs up to the cliff, which makes it impossible to get a boat off, or one to come ashore with any person, excepting at some particular places.

I am, Sir,

Your most obedient Servant,

FRANCIS WHEATLEY.

Mundsley, March 14, 1808.

To CAPTAIN MANBY.

SIR,

YOUR having done me the honour to request particularly that I would be present at your experiments, I have made it a point to be so, and have seen with great pleasure, the ardent zeal with which you prosecute the perfection of your excellent apparatus, for the relief of shipwrecked seamen.

That it is extremely difficult, (and in many cases absolutely impossible,) to get a communication with a vessel, I have seen many instances of, especially on the beach between Yarmouth and Lowestoffe, parallel to which runs, for about 60 miles in length, a ridge of sand about one hundred and fifty yards from the shore, on which vessels ground, and on which breaks (in a storm) a tremendous surf, the intervening space between the ridge and the shore being full of a very cross and heavy sea, which forms an eddy, something of the nature of a whirlpool, that baffles every endeavour of the people on board, or on shore, to get communication with each other; a cask, for instance, or any other floating substance, instead of drawing on shore, turns round, and continues mid-way, and with the wind at, or near north, or south, never comes on shore at all; and I have seen two hours employed in the attempt, which in winter, when the people are perishing fast, owing to their being wet and frozen, is particularly distressing; but in many cases it is absolutely impossible for the men to be on deck, (especially in small coal-laden vessels,) the sea breaking completely over them, as high as their leading blocks, consequently the people are obliged to be in the rigging, and then it is quite out of their power to assist themselves, nor is it possible for the people on shore to give them any, except with the assistance of your excellent apparatus, which I do consider a most effectual relief in such cases of distress.

It has been asserted by some people, that the best method would be, instead of having the apparatus on shore at different stations, to have one on board every ship, so that the shot might be thrown on the beach or rocks, which it is considered would answer best: who made the assertion I cannot tell, but I cannot think it possible to succeed, as will appear when it is considered that in many cases of shipwreck, (especially when the vessel is deep laden,) the men, as I have observed before, are totally unable to keep the deck, the sea completely breaking over it, consequently they are obliged to take to the rigging, where they are soon benumbed by the extreme cold, and quite unable to assist themselves, while those on shore, who are dry, and who have room with exercise to keep their blood in circulation, are the reverse; besides, it takes up a considerable space (more than there is on board small vessels, supposing the men are capable of exerting themselves,) to manage the apparatus. In short, many more reasons might be stated, which are equally strong, but I think it is needless saying any thing further on the subject.

The throwing the grapnel I consider a most important part of the business, as without it I conceive it impossible to get a life-boat off a beach similar to the one I have before mentioned; and, indeed, it has always been found impracticable, and seldom attempted when blowing very hard, and a great surf, as the weight of the boat is so considerable when she is struck by a sea, that it is not in the power of any set of men to pull her through, without the assistance of a rope a-head; now the grapnel being thrown by the force of the powder two hundred yards, falls without the broken water, and enables the men to haul her through it without difficulty; and such a new and effectual power is acquired by the invention, as will be the means of saving many valuable lives: for instance, the efficacy of the grapnel may be conceived by a case I will state,—suppose that a ship is on Caton sand, with a flood tide, and the wind blowing very hard at N. N. E. the life-boat at her station at Lowestoffe is rendered useless, because she is too far to leeward to gain the vessel until perhaps the ebb makes, before the ship would be all to pieces, and every soul on board lost to their country and friends. To obviate such a dreadful calamity, it would be proper to put the life-boat into a carriage made on purpose, and by means of the turnpike road which runs parallel to the shore, she is easily conveyed to any point to windward of the vessel on the sand, so as to be able to gain her; but when she is drawn on the beach ready to be launched, the difficulty of getting her through a tremendous surf of one hundred and fifty yards, is insurmountable, without the assistance of your invention of the grapnel, which enables the men employed to accomplish the task with ease; even supposing the greatest sea possible to be breaking on the beach, the grapnel, together with the life-boat, will save every soul. Now, I do not state this as a case that may happen, but that often (too often indeed) occurs, and really did so to a ship the other day, but there not being either so much wind or sea, as but a very few hours previous to her getting on the sand, the life-boat was able to get off at her station, and by means of horses was towed along the beach to windward of the ship, and passing completely over the body of the sand, without the least danger to any on board her, reached the ship; but had she struck the sand a very short time before she did, the means I have mentioned must have been had recourse to, and the grapnel thrown to haul her off by, as it would have been impossible to have gained the ship any other way, owing to the sea running so very high, that any attempt to get her off at her station would, I have no hesitation in saying, have been quite fruitless.

Before I conclude, I will relate what I was an eye witness of last year, the same morning the Snipe gun brig was on shore, and which I think will prove the great utility of throwing the shot, and endeavouring to get a communication by the means of it.

A large coal-laden brig came on shore on the Gunton beach, a little to the north of the Ness Point, and where it is rather steep, in consequence of which she grounded very near the shore, so that the same sea that struck her broke on the beach, and so very heavy was the surf, that it broke over her as high as her leading blocks, the brig lying broadside to the beach. Being in this dreadful situation, her people were all obliged to take to the rigging for safety, the deck being, by the fury of the sea, completely cleared of every thing; nor was it in our power, although so near them, to give any assistance to the poor men, (nine of whom were in the lee main rigging, and two in the fore top,) but were obliged to be silent spectators of the dreadful scene. Had we been so fortunate as to have been provided with your excellent apparatus, I am confident, before the dreadful end of the fatal catastrophe, we should have been able to have saved, with ease, every soul on board, but we were not so fortunate; the consequence of which was, that all but one man were lost to their friends and country for ever. The brig, after laying some time in this situation, parted at the bins, her upper works, masts, and men, all falling together with a most dreadful crash to sea-board, and in a moment the nine poor men in the lee main shrouds were lost for ever to our view. The two men in the fore top were in a better situation, for when the masts, &c. fell, the wind being at north (parallel to the shore) canted them round, and in consequence the mast heads swung on the beach, when one of the men getting from the top to the wreck, by swimming, was lost, the sea being too heavy for him. Such is the dreadful tale, which might have ended differently, had we been provided with your excellent apparatus.

I am, Sir,
Your obedient Servant,
JOHN FOWLER.

Carton.

To Captain GEO. MANBY, Yarmouth.

The SOCIETY of ARTS, &c. have received Certificates of approbation of Captain George William Manby's invention, from the following persons, who have witnessed experiments made by him on this plan, and state, that the system is fully adequate to answer the laudable purposes of the inventor:

EDMUND K. LACON, Esq. Mayor of Yarmouth.
WM. FISHER, Esq. Deputy Mayor.
WM. DANBY PALMER, Merchant.
THOS. HURRY, Merchant.
WM. HURRY, Merchant.
TIMOTHY STEWARD, Merchant.
B. DOUGLAS, Vice Admiral of Yarmouth Port.
R. CURREY, Captain of his Majesty's ship Roebuck.
RICHARD TURNER, Clerk, Minister of Yarmouth.
CHARLES COBB, Captain, Royal Navy.
THOMAS FORREST, Captain, Royal Navy.
SAMUEL BARKER.
TIMOTHY STEWARD.
JAMES PALMER.
NATHANIEL PALMER.
J. WATSON.
F. R. REYNOLDS.
J. PRESTON.
J. PRESTON, jun.
DOVER COLBY.
JOHN FISHER.
ANDREW YETTS.
B. COSTERTON.
ROBERT WARMINGTON.
M. MAURICE, Esq. Lowestoffe, Secretary to the Suffolk Humane Society.
Sir THOMAS BLOMEFIELD, of the Royal Artillery.
W. PALGRAVE, Collector of the Customs.
J. B. HUNTINGTON, of Somerton.
THOMAS CLOVES, Esq. of Caistor, Lord of the Manor,

Wm. Branford, of Caistor.
Francis Wheatley, of Mundsley.
Richard Wortz.
William Pile.
Samuel George.
John Haylett.
Robert Brown.
Matthew Haylett.

A Certificate from William Taylor, Esq. of his Majesty's Navy Hospital, at Yarmouth, states, that he was present when his Majesty's gun brig Snipe was stranded on Garleston beach, and if Captain Manby's plan had been used, the sixty-seven persons lost would all have been saved, being certain of this from what he saw when the Elizabeth was stranded.

By further Certificates from John Pope, James Easter, and Simon Wilson, it appears, that near two hundred and fifty persons have perished between Yarmouth and Lowestoffe within the last twenty years, the greatest part of whom would have been saved upon Captain Manby's plan.

SIR,

When I had the honour of leaving the models with you, the leather case that effectually prevents the rope from burning, and what I conceive to be the first feature in the invention, was omitted: I therefore inclose one, and request you to draw out the present piece of cord, and pass through it the one now fastened to the small ball, taking care the leather goes once round the eye of the ball, to prevent it from slipping up, and the end made fast in the manner represented

presented by the inclosed. Knowing that the success of the service depends upon the regularity in laying the rope, I have given a plan of the best mode repeated practice has furnished: The fakes should not exceed five or six yards, for if extended to a much greater length, the vibration at each extent (like the pendulum of a clock) becomes so considerable, that a deep-sea line is unable to resist its force, and consequently the object of service is defeated, with the loss of the shot and part of the line. By thus contracting the width of the fakes, will throw the piece of ordnance further from the water's edge, if you wish to have your fakes in one length; to obviate which, and supposing you want to give the greatest possible range, from the stranded vessel being very sharp, or drawing much water, the rope should be laid in different compartments, which I would at all times recommend, particularly should the gale blow on the side, a wind that much oftener brings vessels on shore on this part of the coast, than when blowing dead on the beach; in this case the mortar should be laid behind that compartment most to leeward, to prevent the rope that is running out from getting foul of the next compartment, which would probably be the case if fired from the windward side.

I have the honour to be,

Sir,

Your most obedient humble Servant,

GEO. Wm. MANBY.

Barrack Cottage, Yarmouth,
April 5, 1808.

To C. Taylor, M. D. Sec.

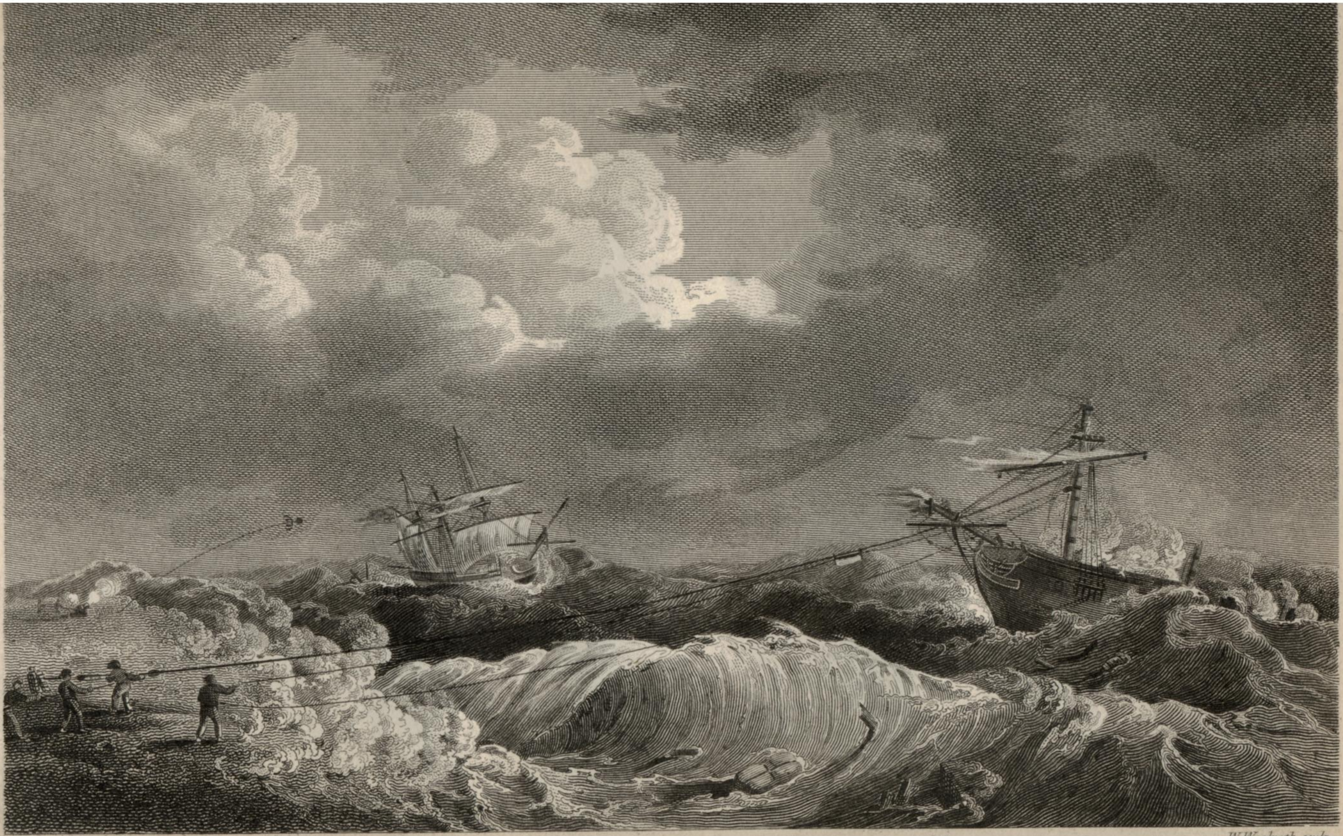
Reference to the Engraving of Captain MANBY's *Mortar, and Method of laying the Ropes for Communication with Stranded Ships. See Pl. IX. Figs.* 3 *and* 4.

Fig. 3 shows the shot and grapnel; B the leather case which covers the end of the rope, and prevents it from burning C, a part of the rope or deep-sea line.

Fig. 4, D, represents the mortar prepared for firing; E the rope laid in different fakes or compartments, ready to be projected by the shot to which it is attached within the mortar, as fully described in Captain Manby's preceding letter.

Reference to the View of Captain MANBY's *Methods of forming Communications with Ships Stranded, as shown in the last Plate of the Volume.*

A five and a half inch royal mortar is laid at the object requiring assistance, if the wind blows directly on the shore; but an allowance to be made to windward, in proportion as the wind blows on the side, as the body of rope will fall considerably to leeward in that case. The rope requires the greatest regularity in being laid, as on that depends its preservation; it must be short faked, as shown in Plate IX. fig. 4. and care taken that the fakes do not touch each other; the end is passed through a leather case of three feet in length, which effectually prevents the rope burning, and bent to a large eye that projects out of the shot. It being fired over the vessel, the rope falls on the rigging. When the persons on board get it, they are to return a rope by the one sent, to which the people on shore will bend a stout rope, and a tailed block rove with the rope



Sartorius pinx.t W. Woolnoth sculp.

Capt.n Manby's Method of forming a Communication with Ships stranded.

rope that had been fired, to get communication; these they will haul on board. The stout rope must then be made fast to any part of the rigging they can depend on; but if the masts are standing, I should recommend that it be fastened to the mast head, just below the cap, for the convenience of getting from the top into the conveyance sent to them, as the people are most likely to assemble in the tops. The other end of the large rope should be tied to a long gun tackle purchase, secured by three iron shod stakes, driven triangularly into the ground. The tackle being bowsed, keeps the rope sufficiently taught, and persons easing off the fall, as the ship rolls, prevent the rope parting, or what it is lashed to, from being carried away. The tailed block is made fast just under the large rope, and one end of the small rope that is rove through it, is bent to the fore part of the cot—the other end to the after-part of the same conveyance. The cot has large eye-let holes in it, to let out water it might catch in dipping through the top of a surf, and lashings to secure the people from being washed out. It is extended by a stretcher of wood, having gudgeons and forelock pins at each end to receive the great rope, and travel on it to and from the vessel, as long as she holds together, for the purpose of bringing on shore the crew, goods, or stores.

In the back scene of the engraving is shown the act of firing a grapnel and rope over a vessel in distress, in order to form a communication with the vessel.

In the fore part is represented the communication formed betwixt a vessel and the shore, with the method of hauling the cot to and from the vessel, by means of an endless rope.